FOOD ENGINEERING

September 1951

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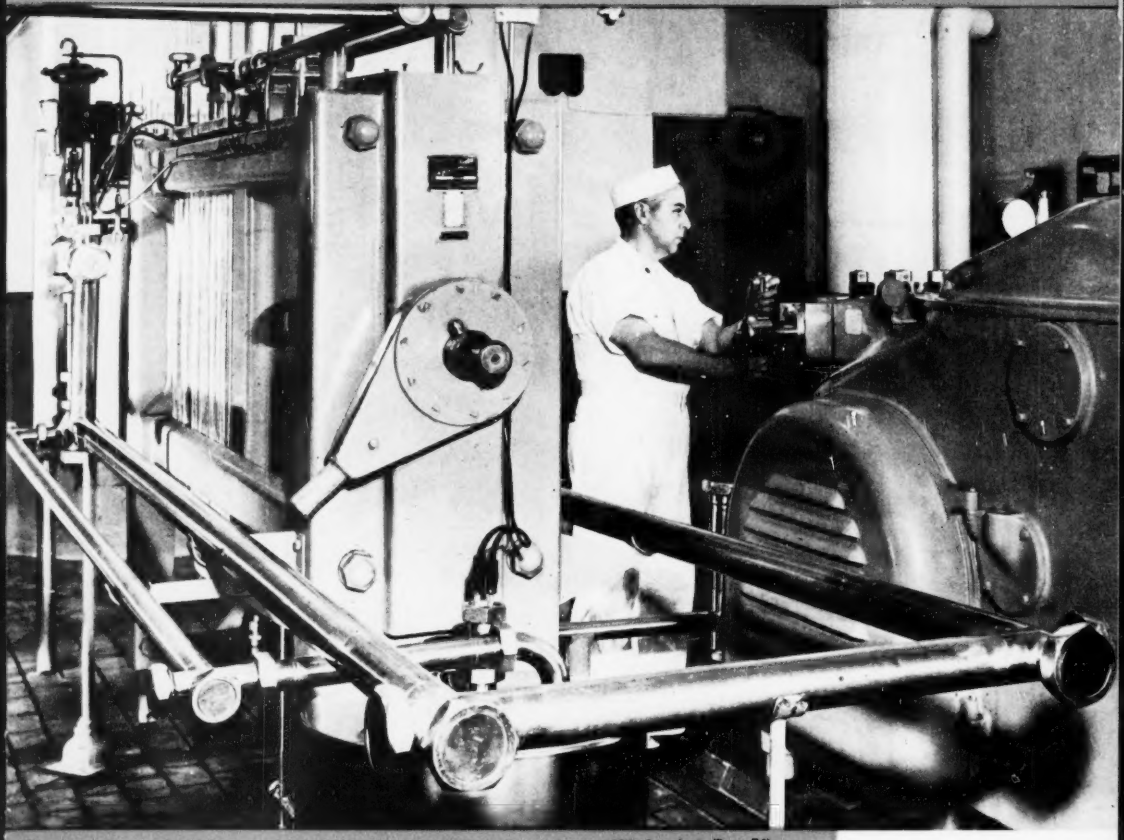

Cleaning costs are cut, maintenance minimized by permanent welded pipelines in Lucerne Milk Co. plant. (Page 74)

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PRACTICAL IDEAS

That Solve Plant Problems

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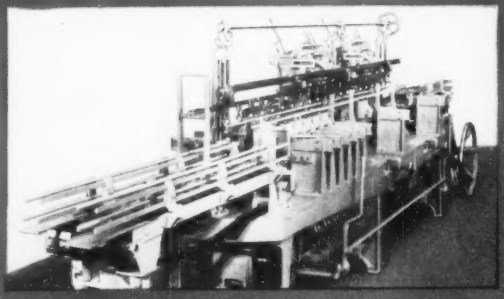

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Food Engineering

Volume 23 SEPTEMBER, 1951 Number 9

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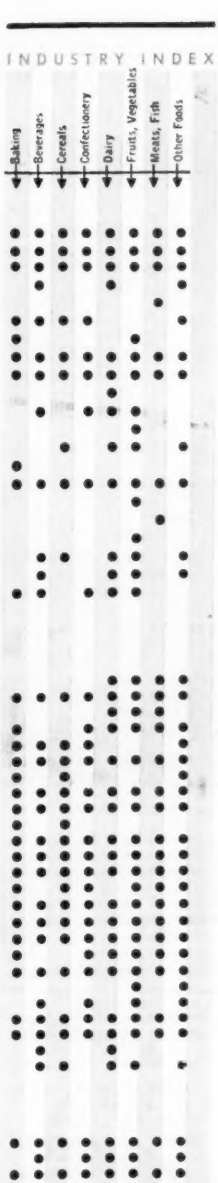
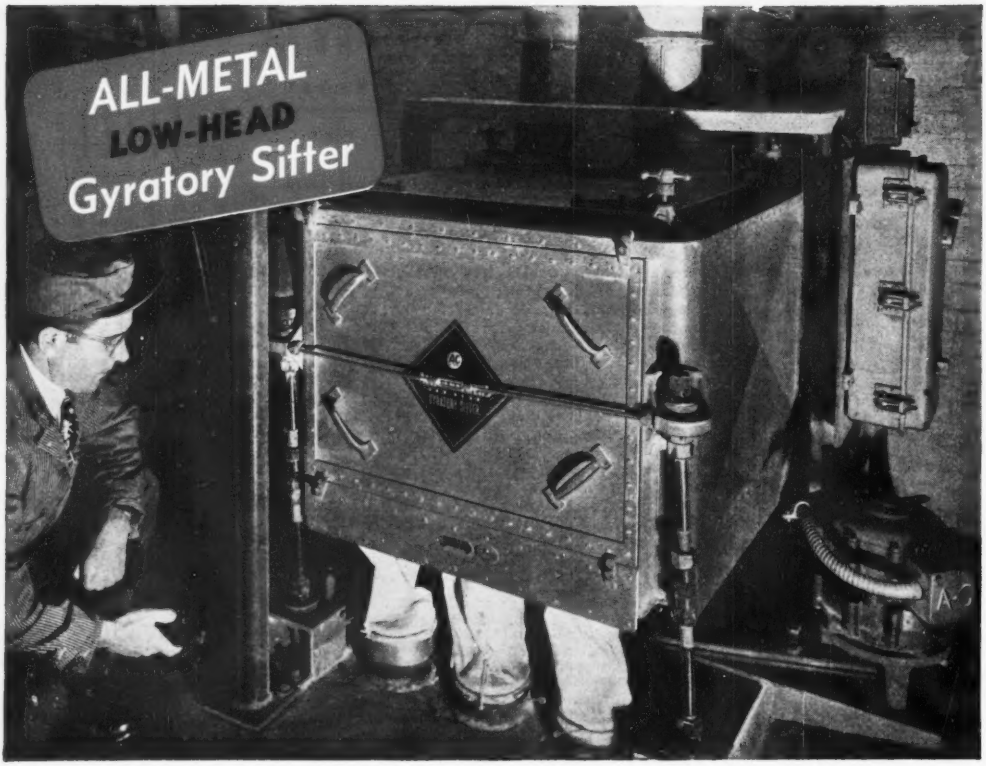
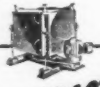




High Capacity and-It's SANITARY!



COMPACT!

Low-Head design provides for easy installation . . . needs little floor space.

VERSATILE!

Handles flour, sugar, starch, nut meats . . . hot or cold dry products.

HIGH CAPACITY!

Sifter's high speed operation contributes to large production capacity.

ALL-METAL!

Made of magnesium and steel for long, dependable operation and easy cleaning.

HAS VARIETY OF FOOD INDUSTRY APPLICATIONS

KELLOGG COMPANY in Battle Creek, Michigan, uses all-metal *Low-Head* gyratory sifters for recleaning and grading flaking grits as they come direct from storage tanks . . . thus safeguarding product purity and "brand name" reputation.

Food industry men from coast to coast find this sanitary machine ideal for many sifting and grading applications. They like its strength and smooth performance . . . and they appreciate its ability to handle high-temperature or abrasive products safely. Ease of cleaning—by air hose, steam or by *washing* with hot or cold water — is another well-liked feature.

This all-metal sifter may be the answer to a sifting problem in *your* food industry plant. Get full details from our nearby sales representative, or write to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3485

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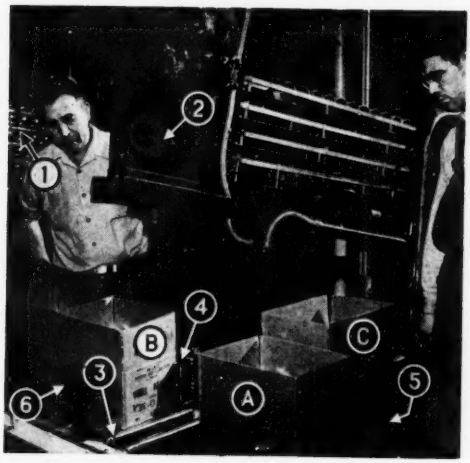
PRACTICAL IDEAS



Merging Cases From Three Lines

A problem developed when Westgate-Sun Harbor Co., San Diego tuna packer, replaced five 250-an-hour case-filling machines with three high-speed machines.

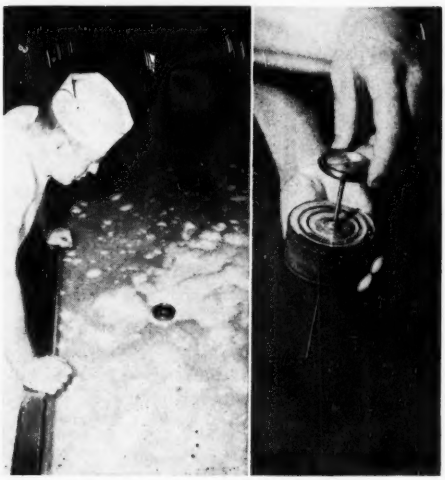
Cases formerly filled by the five slow-speed machines had been transferred by hand from each filler to a single conveyor feeding the case-sealing machine. And now if capital was to be made of all the advantages of the new highspeed machines, cases filled by them should be automatically transferred to the conveyor feeding the case-sealer. Furthermore, the transfer necessarily must be synchronized.

The answer lay in using cam-actuated automatic timers to operate clamps (or stops) on the feed lines. The clamps were located at each right-angle junction of the filling-machine conveyors and case-sealer feed conveyor—one clamp-stop on each conveyor at each station.

Referring to photo: Case (A), which was filled by case-filling machine (1), has just passed the junction of the conveyor from case-filler (2) with the conveyor (3), which feeds into the case-sealer. The following Case (B), also filled by machine (1), has been halted by the fixed stop (4). Case C, which has been held in place by its stop, is now released by the action of cam-operated lever (5), which pushes the case free of its stop.

Cases (A) and (C) are transported on the power driven conveyor (3) to the feed station of the third filling machine. Filled case from the last machine is discharged onto the main conveyor after cases (A) and (C) have passed. Case (B) is released only after sufficient time and space is provided between cases (C) and (B) to permit the case from the third filler to enter onto the sealer feed conveyor in front of Case (B).

Case (B) is released from its case stop by a pivoting motion. The cam operated mechanism behind stop (4) pushes the corner of the case forward until it is clear of the stop. There is then enough space between guide (6) and stop (4) for the case to pass.—*Frank Kirby, Maintenance Department, Westgate-Sun Harbor Co., San Diego.*



Novel Float for Dial Thermometer

From an empty evaporated milk can and several inches of stainless steel tubing we fabricated a special float to support a dial thermometer—making a unit that has proved much more advantageous for measuring temperature during cheese processing than our former technics.

Two methods were discarded before we developed this one. At first, vat temperatures were taken periodically with a mercury-in-glass, handle-top instrument. Aside from the manual stirring and eye squinting required in the use of this thermometer, there was also the ever present hazard of broken glass and mercury in the cheese.

Improvement in this first method came with a switch to stainless steel-stemmed, dial-top instruments. But here hand wielding was still necessary. Also, too much of the operator's time was consumed submerging the stem, and waiting for the dial to come to rest before checking the temperature.

One real advantage was gained, however, aside from an end to the hazard of broken glass: This type instrument could be read at arm's length—permitting closer, more rapid gaging of true temperature.

Yet, temperature checking was still taking too much time—ill-afforded by the cheese-vat operator, whose duties are many and varied because so much happens to demand his eye during settling, coagulation, and cooking.

Floating the dial thermometer shortened checking time—no minutes lost submerging and withdrawing the stem, and temperature constantly recorded.

To make the float, drill through the top and bottom of an evaporated milk can. Holes should be centered and large enough to insert a short length of stainless steel tubing, through which the thermometer stem will pass. Solder the tubing to top and bottom of the can. Thus fabricated, the float should be air tight.

When the thermometer is inserted in the tubing (right photo), its stem can be immersed in the vat liquid to the proper depth, with the dial buoyed above the surface by the can float (left photo). The dial then is within easy reading distance, always registering the temperature.

One other advantage of our floating-dial unit is easy

How BULK-FLO brings new economies

for feeding—conveying—elevating of bulk materials

Check these 5 ways you benefit from LINK-BELT'S advanced engineering

1. Positive movement of material, with no avalanching on vertical or steeply inclined runs, because *solid flights* substantially cover area of BULK-FLO casing.

2. Gentler handling. Material is protected in individual "compartments," resulting in minimum degradation.

3. Self-cleaning, regardless of amount of material being fed. BULK-FLO lends itself to handling batches of material.

4. Constant speed. Variable speeds are not necessary, because capacity can be varied by regulating feed.

5. Horizontal, inclined, vertical, or combinations of these paths, in a single unit—often requiring less units, in less space at lower cost. Multiple feed and discharge points are practicable.

Best of all, when Link-Belt recommends BULK-FLO to your engineers or designing contractor, you know it's the *right* conveyor for your needs. For *Link-Belt* makes a *complete line* of feeding, conveying and elevating machinery.

Book 2175 has complete information on hundreds of materials that BULK-FLO handles profitably. Write for your copy . . . today.

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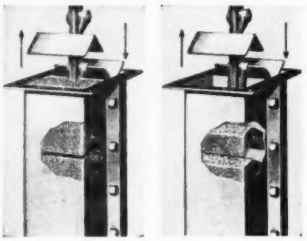
LINK-BELT

BULK-FLO
FEEDERS - CONVEYORS - ELEVATORS

This L-path arrangement of the BULK-FLO Conveyor is particularly adaptable for multiple feed points.

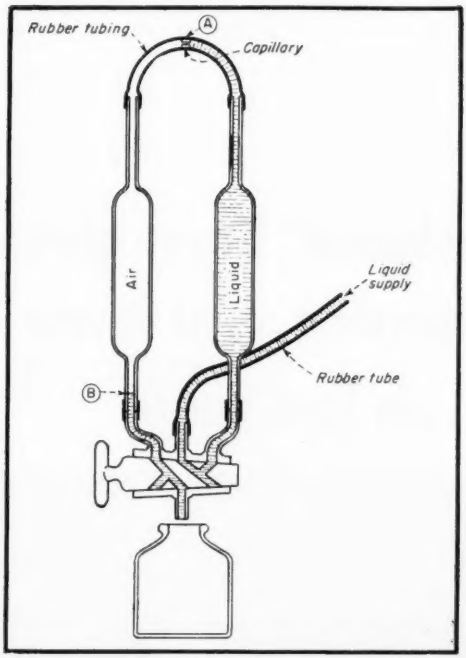


Full or partially loaded, Link-Belt BULK-FLO *with solid flights* provides positive, gentle material handling.

Food handling is easier and safer with BULK-FLO

- Unit is self-clearing through intermediate runs.
- Dust-tight construction.
- Handles batches on cycle operations.
- No contamination from lubrication.
- Chain and casings can be galvanized or tin-dipped to prevent rust, or made of alloy metals.

cleaning. After the thermometer is removed and the stem wiped, a swish of a test-tube brush through the tubing in the float is all that is required.—*W. A. Sommers, Production Manager for Midwest Area, Special Products Div., The Borden Co., Chicago.*



Dispenses Liquid Accurately, Rapidly

By use of the simple arrangement of apparatus sketched above, a liquid can be repeatedly and quickly dispensed with a high degree of accuracy. We use this method for filling bacteriological dilution bottles with 99 ml. of water to an accuracy within 0.3 percent.

Here is how the equipment functions:

The amount of material dispensed is controlled by the amount of air in the system between the capillary tube (A) and the point marked (B). The amount of water dispensed from the full bulb is the equivalent of the amount of air in the empty bulb. Flow of the liquid starts as air from the empty bulb passes into the full bulb. The flow is stopped when water rising in the bulb completely displaces the air and reaches the capillary tube.

At this moment there is a slight jar and a momentary cessation in the flow of water. During this short interval the stopcock should be shut off or turned to refill the next dispenser. If this is not done in a few seconds, water seeping through the capillary tube will drip down the empty bulb and into the water already dispensed.

The small glass capillary tubing (A) retards the flow of liquid during the filling cycle and stops the flow when the correct amount is dispensed.

Volume of liquid dispensed can be varied by changing the level at (B). This adjusts the amount of air in the system. This is done by removing the rubber hose from the empty bulb and filling or draining the empty bulb by the proper rotation of the stopcock. The amount of air in the system can also be varied by using longer or shorter lengths of tubing to connect the bulbs at the top.—*Ben L. Skinner, Juice Industries Div., Clinton Industries, Dunedin, Fla.*

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

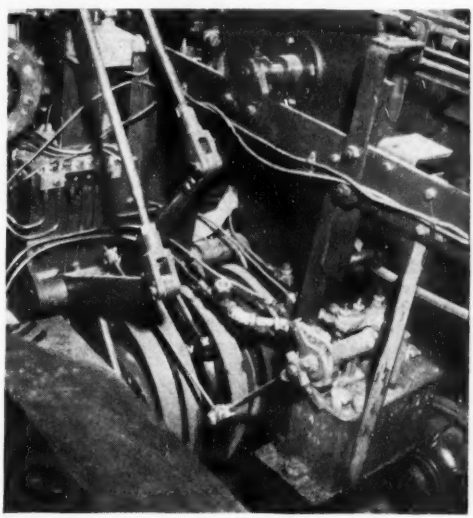
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

JULY PRACTICAL IDEA voted best was "Easy Removal of Sludge From Ammonia," submitted by Wm. E. Paquette and Wm. Geide, Jacob Ruppert brewery, New York. Described was a simply installed still for removing oil, sludge, and other foreign matter from the ammonia system.



Assures Better Machine Lubrication

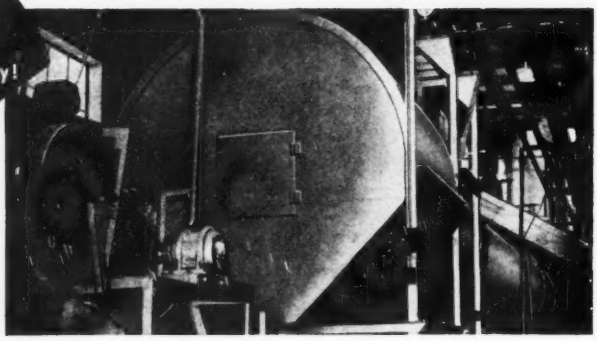
A unique rig-up employing steam engine force lubricators has improved operation and maintenance of the packaging equipment here at Taylor Reed Co., Glenbrook, Conn.

Our packaging units came equipped with a series of small drip oilers as well as attachments for grease gun lubrication. The oilers had to be kept supplied with oil to drip, whenever the machine ran, thus to prevent bearing

See Louisville for
CREATIVE
DRYING
ENGINEERING

New Louisville "Job Designed" Dryer gives 50% more production... at lower cost... in less space

KNOW THE
RESULTS
Before You Buy!



FORMER DRYER

Installed cost	$60,000
Annual production (tons)	6,000
Drying cost per ton	4.65

(space required, 2500 sq. ft.)

LOUISVILLE DRYER

Installed cost	$15,000
Annual production (tons)	9,000
Drying cost per ton	1.15

(space required, 1000 sq. ft.)

YEARLY SAVINGS of LOUISVILLE DRYER in OPERATING COSTS ALONE $21,000

Other General American Equipment:
Turbo-Mixers, Evaporators, Thickeners, Dewaterers, Towers, Tanks, Bins, Filters, Kilns, Pressure Vessels

When production costs are eating up profits, here's something worth looking into. This food processor was using a large, costly installation for drying until he asked a Louisville engineer to survey his production.

A dryer was designed specifically for his operations. Its performance was pre-determined in our own unique research laboratories and pilot plant. *The new dryer turns out better, more valuable production in less space—with great savings in annual operations.*

Without obligation ask a Louisville engineer to survey your drying methods.

PROCESS EQUIPMENT DIVISION
GENERAL AMERICAN
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Louisville Drying Machinery Unit
Over 50 years of creative drying engineering
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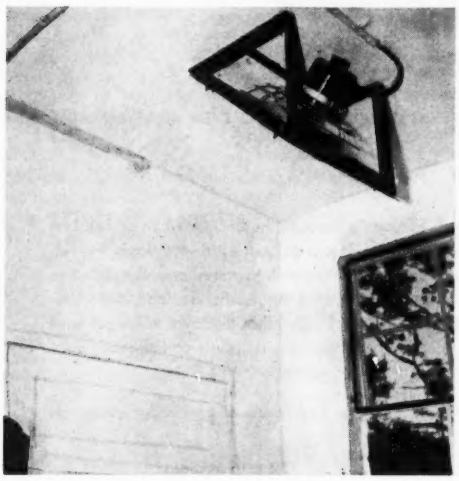
wear and possible shut down of operations. Further, they had to be shut off whenever the machine was stopped, otherwise oil would run over the machine parts and onto the floor.

We experienced the following difficulties with the drip oilers: (1) Their oil capacity was limited, hence they required too frequent filling, (2) their rate of drip was too difficult to control, (3) operators frequently failed to turn them off when the machine was stopped, causing unnecessary cleaning of machine and floor.

These ills have all been cured by installing steam engine force feed lubricators and small-diameter copper tubing from them to the bearings. The lubricators are set to deliver at the rate of about one drop to each bearing every 2 min. This rate has proved ample.

The new lubricator reservoirs seldom have to be filled more than once a week. They require little attention and deliver oil only when the machine is in operation. Our packaging machinery now operates better and without shut down due to faulty lubrication, and machines and plant are easier to keep clean.—*W. A. Reed, Plant Engineer, Taylor Reed Co., Glenbrook, Conn.*



Electric Fan Bars Insects From Plant

Flies, moths, gnats, and other flying insects can be prevented from entering food plants through the use of high velocity electric fans located above and facing plant entrances.

Such installations have been tested at the new poultry eviscerating plant of Amour and Company at Salisbury, Md.

The fan is located in the room in which poultry offal is collected for shipment to a rendering plant. Mounted on a frame made of 1-in. angle iron, the fan is attached to the ceiling of the room so that its air blast covers the entrance aperture when the door is opened.

Regardless of the sanitary handling of poultry offal or the faintness of its odor to humans, flies continue to be attracted. And as the exit door to the offal room is opened, they attempt to swarm in. The fan blast, however, deters them—sweeps them away.

Thus, cans of offal destined for the rendering plant can be loaded through the open door onto trucks without any flies or insects being able to buck the artificial wind.—*Stokes Homan, Poultry Technologist, Armour and Company, Salisbury, Md.*

THREE CLASSES OF FIRES

Choose from these 5 basic types of extinguishers	CLASS A FIRES Paper, wood, cloth, excelsior, rubbish, etc., where quenching and cooling effect of water is required.	CLASS B FIRES Burning liquids (gasoline, oil, paints, cooking fats, etc.) where smothering action is required.	CLASS C FIRES Fires in live electrical equipment (motors, switches, appliances, etc.) where a non-conducting extinguishing agent is required.
CARBON DIOXIDE	Small surface fires only.	YES Excellent Carbon dioxide leaves no residue, does not affect equipment or foodstuffs.	YES Excellent Carbon dioxide is a non-conductor, leaves no residue, will not damage equipment.
DRY CHEMICAL	Small surface fires only.	YES Excellent Chemical absorbs heat and releases smothering gas on fire; chemical shields operator from heat.	YES Excellent Chemical is a non-conductor; fog of dry chemical shields operator from heat.
WATER	YES Excellent Water saturates material and prevents re-kindling.	NO Water will spread fire, not put it out.	NO Water, a conductor, should not be used on live electrical equipment.
FOAM	YES Excellent Foam has smothering action.	YES Excellent Smothering blanket does not dissipate, floats on top of most boiling liquids.	NO Foam is a conductor and should never be used on live electrical equipment.
VAPORIZING LIQUID	Small surface fires only.	YES Releases heavy smothering gas on fire. Be careful of fumes.	YES Liquid is a non-conductor and will not damage equipment.

Every Employee a Fire Fighter

Each year, fire exacts from industry an enormous toll in life, property, and lost production. And World War III, if it comes, would raise it. For saboteurs would immediately go into action, with arson a favorite weapon.

Large scale war would bring bombs—incendiary, high-explosive, and probably atomic. These would multiply the fire hazard many times.

So setting up a fire fighting program to protect your plant is a wise precaution. Under present circumstances, such a program is vital. It should be a "No. 1 must."

Here are suggestions to guide your planning:

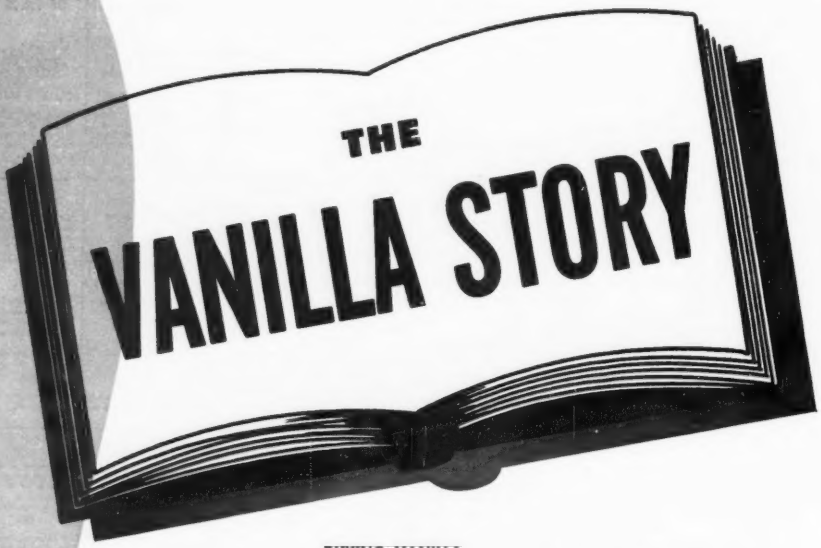
Your local municipal firemen should be called in to survey your properties, primarily for familiarization with the fire fighting problems of your plant against the day it may be necessary to call them to your aid. Chances of quickly extinguishing a fire are enhanced if your setup is known to them.

They can help you otherwise in checking fire extinguishing equipment. It's preferable that your own employees prevent, or at least nip at the start, any fires in your plant. Therefore, the firemen will gladly help you improve your fire fighting brigade, if you already have one. If not, they will assist you in starting one, willingly contributing valuable aid in training the key men.

They know where fires are most certain to break out, and the locations where fires will be most difficult to control. They will probably demonstrate steps in controlling and extinguishing fires.

When a brigade is formed, then comes the drilling—regular and consistent, especially for key men. Constant drilling has two important assets: When an emergency arises, correct fire extinguishing procedure is automatically followed by thoroughly drilled men. And there is avoided the fear and confusion that accounts for ineffectual "racing in circles," or acts contributing to the spread of the blaze.

While much reliance must be placed on the key men, every employee should have some training. Any employee may be able to quickly control a threatening outbreak if



BUYING VANILLA
IS A CONFUSING JOB AND KNOWING WHAT YOU'RE GETTING IS EVEN MORE DIFFICULT.

Here's the Reason

The finest flavor is that of an old fashioned, leisurely extract of the best Mexican or Bourbon beans. Due to yield and time required, such extracts are seldom seen in today's market. To meet practical price requirements, economies are used, such as speedier and exhaustive extractions, cheaper grades and powdered beans . . . then for further savings, the imitations, using vanillin, other aromatics and even coumarin. Each has its flavor value yet each step carries flavor farther from true vanilla. In trying any vanilla, pure or imitation, compare it to the finest pure extract. Get the best you can afford.

ALVA can supply the finest as well as every other practical grade of vanilla for every use, honestly priced and honestly labeled. Here are a few:

- Pure Vanilla Extracts, **single strength, 2, 4 and 10 fold**
- Oleo Resin Pure Vanillas
- Imitation Vanillas
- **ALVANYA** (imit. vanilla absolute) duplicating the aromatic portion of the bean itself. Excellent when used alone or to improve any commercial vanilla at a saving. Extreme temperature stability.
- Vanilla sugars, **pure and imitation.**

Tell us what you want and we will send you the best vanilla to meet your requirements.

VAN AMERINGEN-HAEBLER, INC.
521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS

he knows what to do—or, what is often more important, what not to do.

Particularly, it's necessary to know what not to do in applying extinguishers. Posters giving such information as presented on the accompanying chart should be displayed throughout the plant, especially adjacent to fire extinguishing equipment, so that every employee can learn which type of extinguisher to use, and which not to use, on each kind of fire. It is also wise to circulate the information in pamphlet form.

Each unit of fire extinguishing equipment should be prominently labeled as a further guide to application of the right unit to each kind of fire. Labels should specifically indicate where *not* to use the equipment's contents, as well as the kind of fire it will put out.—*From "How to Prepare Your Plant for Atomic Attack", a Pamphlet Issued by Walter Kidde & Co., Belleville, N. J.*

Cuts Losses In Trucking Perishables

Development of a dual-refrigerated custom-built truck body has solved the problem of transporting perishable foods for Safeway Stores, Denver—by cutting chilling take-down time in half and simplifying schedules.

The company had experienced profit leaks prior to development of the unit. Its stores are located in widely scattered communities in the Rocky Mountain area, and servicing these outlets in the summer months with refrigerated foods was a problem.

Two units were built. Each has an insulated body, 15 ft. long, 6½ ft. high, and 8 ft. wide, and is equipped with dual compressors of equal size. These are mounted in separate refrigeration compartments on either side of the body. The insulation installed is among the heaviest used by the refrigerated-transport industry. It includes 8 in. of cork in the floor and ceiling, plus 6 to 8 in. of Fiberglas in sides, front panels, and at other locations.

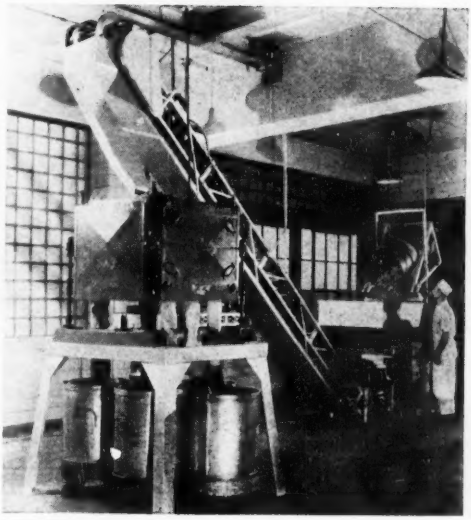
For temperature maintenance, each body depends upon two 1½ hp. Frigidaire condensing units, which may be operated either together or individually, according to need. Each furnishes refrigeration to a series of cold plates mounted in the ceiling of the unit, and there is equipment for "tie-down" power, with long extension cords. Thus, each truck can be left refrigerating over night, before beginning the following day's run.

Safeway's refrigeration units likewise incorporate a special feature in that each is connected with cold plates via flexible tubing in place of the usual copper pipe. The tubing installation, which after much testing by the custom body-building firm, has been proved thoroughly efficient. It consists of specially designed, heavy rubber tubing, with an inert chemical lining, providing for far more durability, safety, and proof against leakage.

Before putting the units on active duty, it was proved that the interior of each could be reduced to zero temperature in less than 8 hr, when the two compressors operated simultaneously—instead of the usual 14 to 16 hr. Likewise, by retaining one compressor as a "standby" in the event of failure of the other, it was possible to maintain refrigerated delivery service over long hauls, without tying up the van for service or returning it to headquarters.

Equipped with recording thermometers, each truck was tested by sending it out on a trial run over a typical delivery route. It was found that use of the dual compressors eliminated about one-third of the time required to cover a standard 500-mi. route.

Selection of one or both of the compressors is optional with the driver, by means of a switch control panel mounted in the cab. Instruments detail the refrigerating efficiency of each, and also interior temperature.—*Robert A. Latimer, 17 Corona, Denver, Colo.*



Speeds Grading, Eliminates Vibration

Installation of a totally self-contained sifter for the grading of ground nuts for confectionery, ice cream, and bakery products, has corrected a vibration problem in the Fred Sanders plant, Detroit.

Originally, a heavy metal grading screen was suspended from the ceiling of the plant's nut room. But this caused too much vibration. Its replacement with an all-metal Low-Head gyratory sifter is reported eliminating this difficulty.

The sifter has a magnesium box and six sieves. It is making five separations at a rate of 1,500 lb. per hr.—the full capacity of the nut chopper—but it is capable of handling considerably more.

Because of its all-metal construction, the unit is easy to clean. It can be washed with either hot or cold water or cleaned with an air hose. The latter method is employed at Sanders.

The sifter has 3, 4, 5, 6 and 8-mesh wire screens, securely attached to the sieve frames. Sieves, resembling drawers, are easily withdrawn and replaced. Unit is powered by a 1-hp. 1,740-rpm. 220/440-v. explosion-proof motor and is equipped with V-belt drive.—*Allis-Chalmers Mfg. Co., Milwaukee.*

You Can Stretch Paper Supplies

Here are suggestions on how to conserve packaging materials during these days when the supplies of cellophane, glassine (waxed and plain), and other packaging materials are critical.

Now is the time to start, not later when packaging materials may become even more difficult to obtain.

1. Check your wrapping operation. Are you using rolls wider than absolutely necessary? Even though it requires closer supervision by machine operators, scarce materials may be made to go further, without loss of protection, by employing a slightly reduced roll width.

Bakers who use end labels on their bread can often use a shorter fold, since the labels help secure the seals. One baker cut his roll width from 16 in. to 15 in., saving 1 roll out of every 16.

2. Faulty machine adjustment may result in greater overlap than necessary. Machine cut-off should be reduced

Century 1 TO 400 H.P. MOTORS

Choose From These Many Types To Fit Your Job

DEPENDABLE CONSTRUCTION . . . Plus

PROPER SELECTION MINIMIZE SHUTDOWNS

Century Electric Company is celebrating its 50th year in the electrical industry.

It's easy to select the proper electric motor for your job from Century's complete line — from 1/6 to 400 horsepower. A wide range of types and kinds are available to satisfy all popular requirements. They are carefully designed, built and tested to assure maximum performance throughout their long life.

Here are examples of Century's line of INTEGRAL HORSEPOWER motors.

Polyphase

TYPE SC—Open Drip proof General Purpose Motor. Meets the needs of most installations where operating conditions are relatively clean and dry.

TYPE SC—Splash proof. Supplies protection where plants must be washed down. Keeps out all falling or splashing liquids—rain, snow, sleet, etc.

TYPE SC—Totally Enclosed Fan Cooled. Protects against dusts, mist, oil, fog. Inner frame protects vital parts of the motor, seals out harmful matter.

TYPE SC—Explosion proof. Protects life and property in atmospheres charged with explosive dusts or gases.

TYPE SR—Wound Rotor. Open Construction. Ideal for applications requiring low starting current with high starting torque, reversing or adjustable speed.

TYPE SR—Wound Rotor Splash proof. Same electrical characteristics as motor shown above. In addition, gives adequate protection against falling and splashing liquids.

Single Phase

TYPE RS—Repulsion Start Induction, Open Construction, Single Phase Brush Lifting Motor. Combines high starting torque with low starting current.

683

TYPE RS—Splash proof. Same advantages as open construction, plus protection against splashing and falling liquids.

TYPE CSH—Capacitor Start Induction, Single Phase Motor. Suitable when high starting torque with normal starting current is satisfactory.

TYPE CSH—Splash proof. Same advantages as motor shown above, plus protection against falling and splashing liquids.

Direct Current

TYPE DN—Direct Current Motors. Suitable for use where direct current is available, or its use desirable.

TYPE DN—Direct Current, Splash proof.

TYPE SY—Synchronous. Suitable for continuous operation at a uniform load for power factor correction.

In addition to a complete line of integral horsepower motors, Century offers fractional horsepower motors, gear motors, generators, AC and DC motor generator sets.

For a long life of satisfactory performance, specify Century motors for all your electric power requirements.

CENTURY ELECTRIC COMPANY, 1806 Pine Street, St. Louis 3, Missouri • Offices and Stock Points in Principal Cities

to the minimum necessary for a good wrap, and should be checked consistently by operators on all shifts. Reducing the cut-off 1 in. on a 9 in. x 6 in. x 1 in. cellophane-wrapped package permits wrapping 263 additional packages from one 33 lb. roll.

3. Shapes and sizes should, where practical, be changed to save overwrap. Can you reduce the size of your present tray or folding carton? If you can, you will make a considerable saving. And if your bags are stapled, it may pay you in material savings to install heat-sealing equipment. Also, bags may be larger than necessary. Investigate the possible savings in a shift from a flat-type package to a roll type.

4. Don't permit careless operators to discard stub rolls. Instead, have them carefully wrapped and set aside. Later, run them as a group.

5. In your effort to stretch materials so as to obtain more packages from the available supply, do not shift to another weight unless you are certain you are getting the same or more protection in the shift.

6. Almost all types of packaging materials perform best when properly conditioned. Check on storage conditions where your supplies are warehoused. Packaging materials should be kept where extremes of temperature and humidity are avoided. Stacking supplies in low piles should be practiced to avoid excessive pressure at the bottom. Sheets of cellophane shou'd not be stacked over twelve bundles high.

Two more suggestions: Return unused portions to the original container at the end of the day. Never stack unwrapped rolls of film on their ends.

7. Check automatic packaging machines, paying particular attention to feed adjustments, forming adjustments, cutting mechanism, and sealing controls. Select the most competent operators for the packaging lines. Step up maintenance and repairs.

8. Quite an amount of packaging materials can be wasted through your employees' ignorance or indifference—or can be saved by their vigilance and cooperation. What are you doing about employee education regarding the use and conservation of packaging materials? Appreciation of the need for conserving fi'm and other packaging material is basic in any educational efforts on your part.

Here are suggestions which will guide you in emphasizing to your employees the need for packaging material savings:

Place posters in storage, locker, and packaging areas. Put steel rulers near wrapping machines, and require frequent checking by reliable operators or supervisors. See that there are periodic reports on waste. Offer prizes, or other inducements, for the group with the least waste. Hold regular group meetings to emphasize the need for thriftiness in the use of packaging material. Increase the vigilance of supervision.

If you follow these suggestions, it is a good bet you will be able to obtain more packages from the same critical supply.—*From "Packages & People," House Organ of E. I. du Pont De Nemours & Co.*

Speeds Potato-Quality Test

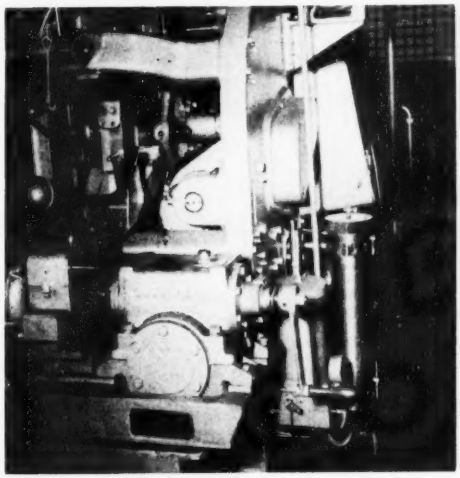
Checking samples of potatoes to determine whether they have the required qualities for processing into potato chips is a routine laboratory responsibility in our plant.

Preparing the potatoes into potato chips in the laboratory is objectionable for two reasons: Laboratory preparation and frying of samples is time consuming. Furthermore, laboratory operations do not always adequately duplicate those of the production line.

But using a simple method, potatoes for testing can be prepared rapidly with minimum effort and processed into test samples on the plant production line.

Peeled potato samples are cored with a cork borer in the laboratory and then sliced to the proper thickness, with uniform hole in the center. Next, these lab slices are dropped onto the plant line at the discharge end of the production slicer. The lab slices are then processed into potato chips along with the regular run and are readily identified by their holes. These test chips are collected and returned to the laboratory to be checked for quality.

This system conserves time and labor. And results are accurate, since the samples have been put through under production line conditions.—*L. E. Pagel, Technical Director, Red Dot Foods, Inc., Madison, Wis.*



Gluing of Milk Cartons Improved

Addition of a home-made automatic glue applier to our Pure-Pak carton forming machine has made this packaging unit trouble free and more productive.

Formerly, a small reservoir mounted atop the machine fed glue onto the roller that seals container bottoms to the cardboard sides of these containers. To fill this reservoir required climbing up on the machine and pouring glue from a hand-tilted ladle.

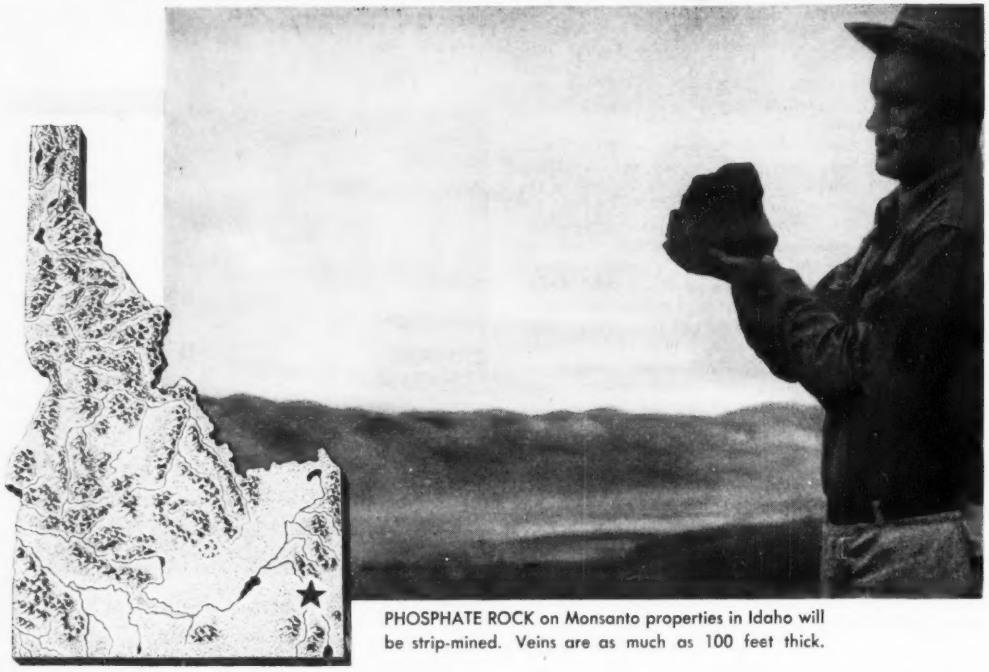
Quite often our conventional glue feeder would gum up and have to be cleaned. Because of this clogging, cartons were sometimes improperly sealed. The feed demanded constant watching to avoid defective cartons.

To improve the operation, we devised our own feed, consisting of a stainless steel reservoir of several gallons capacity, equipped with special feed attachments. The reservoir comprised about 2 ft. of 4-in. stainless steel sanitary pipe, closed at the ends with standard 3A4 hex nut end connections. We connected this reservoir to the glue rolls through a length of $\frac{1}{4}$-in. pipe. This new reservoir was located in a more accessible position—on the side of the packaging machine.

A regular gas station-type air hose is attached to a petcock and valve threaded into the top of the reservoir. With this arrangement, air is applied to keep the glue under a constant head of pressure, thus assuring its steady flow through the two valves that feed the machine's glue rolls.

The machine operator merely presses a handy lever at the side of the packaging machine when needing glue at the rolls.—*Walter Riedel, Production Manager, Sanitary Farm Dairies, Inc., St. Paul, Minn.*

MONSANTO Expands



PHOSPHATE ROCK on Monsanto properties in Idaho will be strip-mined. Veins are as much as 100 feet thick.

Monsanto, already the world's largest producer of elemental phosphorus, has added extensive holdings of phosphate rock near Soda Springs, Idaho. To extract elemental phosphorus of better than 99.9% purity from this rock, Monsanto is constructing a large electric furnace plant at Soda Springs, Idaho.

The output of this furnace plant, available next year, will substantially increase Monsanto's production of elemental phosphorus. It will mean more phosphoric acid and its derivatives for myriad industries using such products.

Elemental phosphorus from the Soda Springs furnace plant will travel by rail to Monsanto plants in Monsanto, Illinois; St. Louis, Missouri; Trenton, Michigan; and Anniston, Alabama; where it is converted into pure phosphoric acid and numerous phosphates serving hundreds of industries. Expansion of manufacturing facilities at these processing plants is under way.

SINCE 1937, Monsanto has been producing elemental phosphorus at its Monsanto, Tennessee, plant and today there are six large electric furnaces in the Monsanto, Tennessee, installation shown at the left. Monsanto originated the present-day method of large-volume elemental phosphorus production and was the first to ship the element in tank-car quantities.

Phosphorus Production

MORE PHOSPHORUS = MORE PHOSPHORIC ACID, MORE PHOSPHATES, MORE PHOSPHORUS DERIVATIVES

Phosphorus Pentoxide

Phosphorus burned in dry air produces phosphorus pentoxide from which these products are derived:

Methyl Phosphoric Acid
Ethyl Phosphoric Acid
Propyl Phosphoric Acid
Butyl Phosphoric Acid
Amyl Phosphoric Acid

PHOSPHORIC ACID

Phosphorus burned in moist atmosphere produces phosphoric acid used in various industries and from which sodium phosphates, calcium phosphates, ammonium phosphates, potassium phosphates and numerous other phosphates are derived.

Phosphorus Trichloride

Phosphorus plus chlorine produces phosphorus trichloride from which the following are derived:

Triethyl Phosphite
Phosphorus Oxychloride
Triethyl Phosphate
Tributyl Phosphate
Trioctyl Phosphate
Tricresyl Phosphate
Triphenyl Phosphate

SODIUM PHOSPHATES

Mono Sodium Phosphate
Uses:
Acid Cleaners
Water treatment
Textiles

Di Sodium Phosphate
Uses:
Cheese
Leather
Textiles
Detergents
Water treatment
Dye
Pigments

Tri Sodium Phosphate
Uses:
Water softening
Detergent
Metal cleaning
Water treatment
Textiles

Tetra Sodium Pyrophosphate
Uses:
Soap
Textiles
Detergents
Clay dispersant
Dyeing
Bleaching
Pitch control
Metal cleaning
Oil well drilling
Water treatment
Water softening
Glass

Sodium Acid Pyrophosphate
Uses:
Baking powder
Oil well drilling
Electroplating
Prepared flour

CALCIUM PHOSPHATES

Mono Calcium Phosphate
Uses:
Baking powder
Self-rising flour
Self-rising corn meal
Prepared flour
Food enrichment

Di Calcium Phosphate
Uses:
Tooth paste
Tooth powder
Food enrichment
Pharmaceutical

Tri Calcium Phosphate
Uses:
Tooth paste
Tooth powder
Anticaking agent
Food enrichment
Pharmaceutical

Tetra Calcium Pyrophosphate
Uses:
Food enrichment
Pharmaceutical

Sodium Polyphosphate
Uses:
Oil well drilling
Textiles
Water treatment
Detergents

Sodium Tripoly Phosphate
Uses:
Detergents
Pitch control
Metal cleaners
Water treatment
Clay dispersant

PHOSPHORIC ACID

Uses:
Soft drinks
Rustproofing
Metal cleaning
Gelatin
Jelly and preserves
Silage treatment
Fertilizer
Textiles
Sugar
Pharmaceutical
Water treatment

AMMONIUM PHOSPHATES

Mono Ammonium Phosphate
Uses:
Flameproofing
Yeast
Malt
Plant nutrient
Acid cleaners

Di Ammonium Phosphate
Uses:
Flameproofing
Yeast
Plant nutrient
Ammoniated dentifrices

POTASSIUM PHOSPHATES

Mono Potassium Phosphate
Uses:
Pharmaceutical
Plant nutrient

Di Potassium Phosphate
Uses:
Fermentation
Pharmaceutical
Nutrient solutions

Tri Potassium Phosphate
Uses:
Oil refining

Tetra Potassium Pyrophosphate
Uses:
Soap
Textiles
Water softener
Synthetic rubber manufacture

OTHER PHOSPHATES

Iron Phosphates
Magnesium Phosphates
Aluminum Phosphates
Barium Phosphates
Beryllium Phosphates
Copper Phosphates
Lead Phosphates
Lithium Phosphates
Silver Phosphates
Zinc Phosphates

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CHEMICALS AND PLASTICS
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FOR INFORMATION on Monsanto's chemically pure phosphoric acid and phosphates, contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri.

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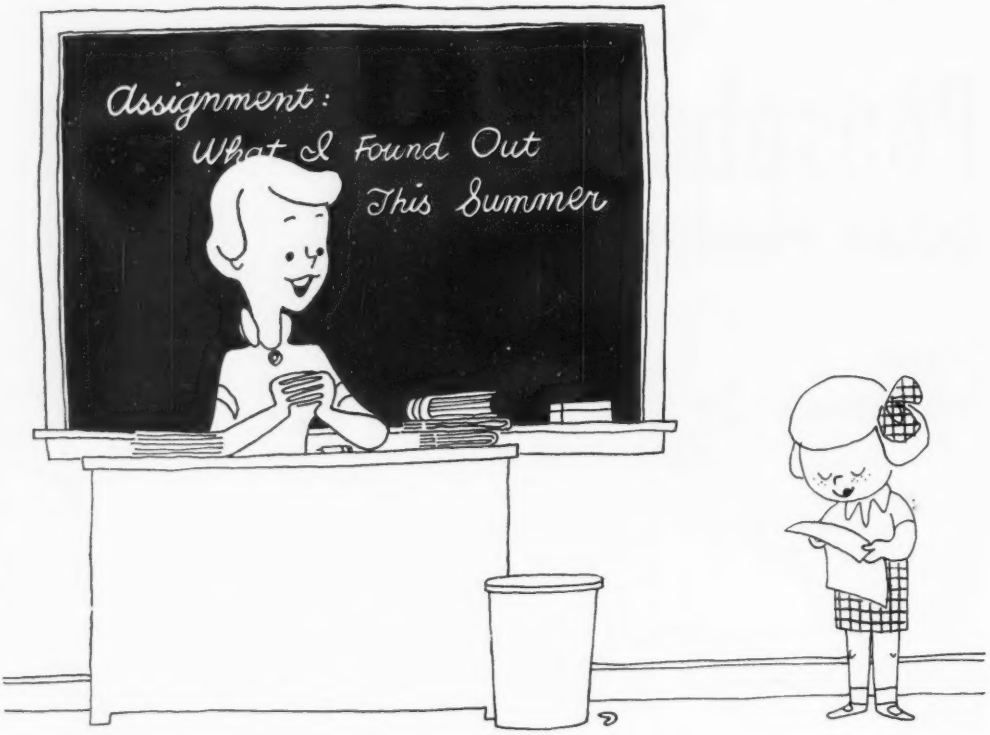

"NORDA RASPBERRY FLAVOR'S swell—
We have it lots, these nights;
It tastes like fresh raspberries you pick—
Without mosquito bites"

NORDA RASPBERRY FLAVOR'S *naturalness* is the reason why people like it. It's rich with raspberry-realness—distinguished by all the delicate goodness of the true, sun-fattened fruit.

Try it and see. See how much Norda Raspberry Flavor, black and red, both genuine and imitation, will improve your products. Test Norda Raspberry in your mixes, icings, fondants, and jellies. Doesn't it give them more taste-appeal?

Norda standards of perfection assure you protection. Norda skills help increase your sales. Get to know Norda. Send today for generous free samples of Norda Raspberry Flavors. Let Norda help you bring you more business.

Norda Raspberry . . .
"Another Favorite to Flavor It"

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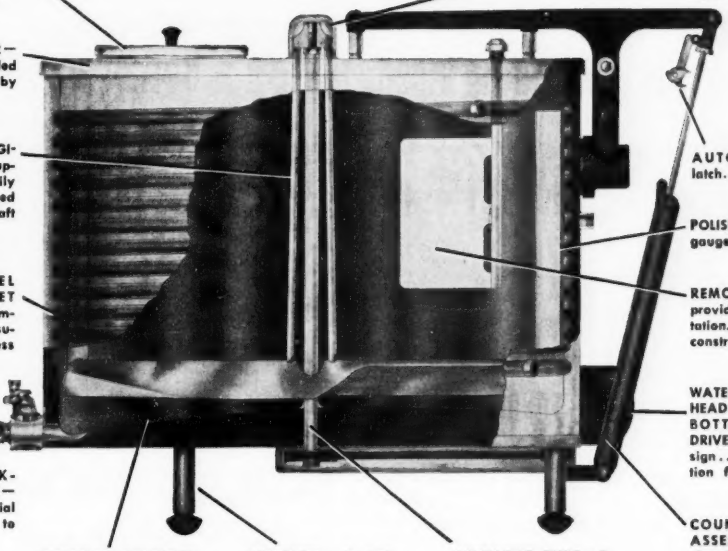
You'll want all these advanced Pfaudler features in your next pressure process vats . . .



INSPECTION OPENING with 5-in. "Lift-Off" stainless steel cover.

INSULATED COVER—One-piece, all welded stainless steel. Lifted by counterbalance.

AIRPLANE TYPE AGITATOR with truss supports. Can be easily lifted and disengaged from the drive shaft with one hand.

STAINLESS STEEL PRESSURE JACKET surrounded by 2-in. compressed fiberglass insulation, polished stainless steel sheathing.

PFAUDLER LEAK-DETECTOR VALVE—Plug type with special hold-down clamp to prevent leakage.

CONVEX BOTTOM HEAD—Gives extra strength and just the right pitch for complete drainage.

SANITARY adjustable leg supports.

AGITATOR TUBE of welded stainless steel extends above liquid level—no need for packing or rotary seals.

COUNTERBALANCE ASSEMBLY with enclosed spring for effortless opening and closing of cover.

WATERPROOF GEAR-HEAD MOTOR AND BOTTOM "V"-BELT DRIVE—Simplified design . . . sturdy construction for long service.

REMOVABLE BAFFLE provides improved agitation. Stainless steel construction.

POLISHED LINER of 14-gauge stainless steel.

AUTOMATIC cover latch.

AGITATOR COVER CAP—Agitator bearing surface is above liquid level. This eliminates need for agitator opening in vat liner.

LARGE PFAUDLER pressure process vat with agitator drive at top.

Pfaudler Pressure "Lo-Vats" have set performance records in processing both food and dairy specialty products. They deliver the efficient heating, holding, cooling and mixing that help to keep your operating costs at a minimum. The jackets are built to withstand 150 lb. pressure—no danger of damage through operating error. In addition, Pfaudler's construction "know-how" has been coupled with the latest design features to make our new "Lo-Vat" Pressure Process units better than ever. It will pay you to consider *all* their important features before you buy your next process vats.

Pfaudler Pressure Process Vats are made in 100, 200 and 300 gallon capacities. A larger Pfaudler pressure process vat with agitator installed at the top is available in 500, 800 and 1000 gallon capacities. All models are self-draining and simple in design for easy cleaning.

Pfaudler

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Engineers and Fabricators of Food Processing Equipment

GLASS-LINED STEEL
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Tantalum—Carbon Steel
Solid or Clad Stainless Steel
Nickel, Inconel, Monel

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Please send me full details on:

☐ Pfaudler Pressure "Lo-Vats"; 100, 200 and 300 gal.

☐ Pfaudler Pressure Process Vats; 500, 800 and 1000 gal.

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Company_____

Title_____

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Betner...*America's Busiest Bags*

Whatever the packaging need, there's a Betner bag to fill it!

Just a few examples of Betner's complete bagging service:

DUO-TITE . . . *the Perfect "No-Sift" Bag*

At last, the ideal bag for products which must be packaged in siftproof containers . . . insecticides, fertilizers and other dry chemicals. DUO-TITE's sturdy construction combines special liners with folding, gluing, and heat-sealing. Available in sizes holding up to 25 lbs. of bulk powdered material.

THERMOSEAL . . . *the Bag with 20% More Protection*

It's a fact. There is 20% more protection offered by Betner's THERMOSEAL than by other closures. Best of all, THERMOSEAL eliminates staples and other adhesives, and insures water-vapor protection, siftproofness and retention of flavor.

BENCOSEAL . . . *the Bag or Wrap with Extreme Water-Vapor Protection*

Absolute sanitation, dryness and flavor freshness are guaranteed by this unique combination of paper, metal foil and tissue laminated with a thermoplastic wax film. BENCOSEAL may be heat-sealed at moderately high temperatures without fear of blocking, thereby rendering itself to high speed production. It lends itself to any type of printing for consumer eye-appeal.

FLAV-O-TAINER . . . *the Bag with Vacuum-Packed Freshness*

Whenever freshness is a must—Betner's FLAV-O-TAINER delivers it! Lined with Pliofilm (mfd. by Goodyear T. & R. Co.), all inner seams are hermetically sealed. And simply by replacing air with inert gas, and heat sealing at top, FLAV-O-TAINER becomes an air tight unit.

A complete bag service . . .

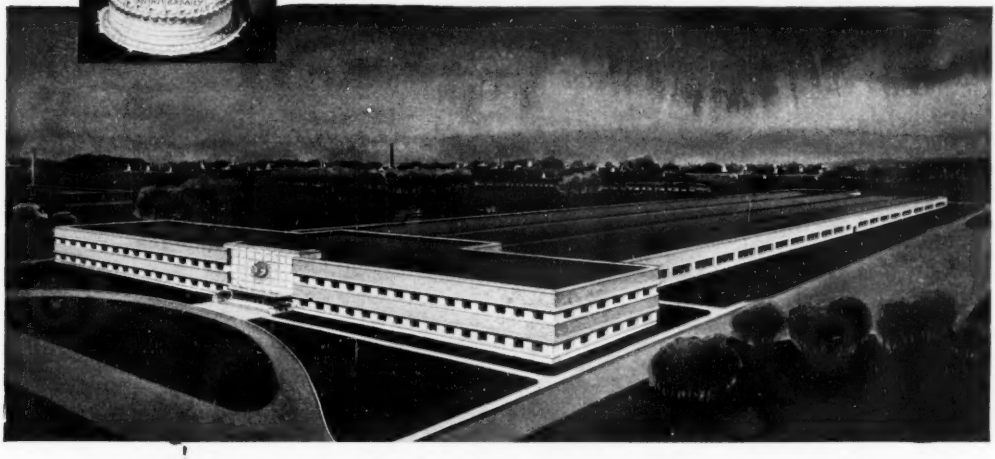
from idea to finished bag. Also machinery for closing coffee bags, and inserting and closing liner bags in cartons. Your inquiries are welcome. Samples with full technical information will be promptly supplied.

Benj C Betner Co DEVON, PA.

BENJ. C. BETNER CO., Richmond, Va.; BENJ. C. BETNER CO., of WISCONSIN, Appleton, Wisconsin; BENJ. C. BETNER CO., Paris, Texas; BENJ. C. BETNER CO. of CALIFORNIA, Los Angeles, California; Southern Packaging Corporation, Affiliate of BENJ. C. BETNER CO.

Commemorating our 60th Anniversary

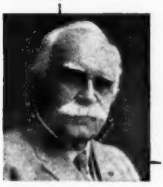
THE POWERS REGULATOR COMPANY



New Factory and General Office Building: **3400 Oakton Street, Skokie, Illinois**

World's Most Modern Factory Producing Automatic Temperature and Humidity Control

. . . to meet the greatly increased demand for POWERS products and to give you better controls, better deliveries and better values . . . these advantages are possible with our large new plant and modern production facilities. With an enlarged engineering and production staff, plus 60 years experience in heating, ventilating, air conditioning and process control, we believe we can be of greater service than ever before to our many friends who have contributed to our success.



WILLIAM PENN POWERS . . . with his invention of the first all pneumatic system of temperature control and gradual acting vapor disc thermostat made an invaluable contribution to the modern science of heating, air conditioning and industrial process control.

POWERS — TEMPERATURE AND HUMIDITY CONTROL — 60th ANNIVERSARY 1891 1951

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AN ORIGINAL LITHOGRAPH BY HENRY E. WINZENREID

"Down by the Old Mill Stream . . ."*

The old community grist mill of yesteryear is a far cry from today's great centralized mills that send a wide variety of fine flours to every part of the country. Along the way, many of these special flours need the help of protective packaging papers to preserve their wholesome goodness . . . papers of the type Riegel has carefully developed for this growing industry.

There are many other Riegel Papers for almost any packaging need . . . papers that are now serving the sales leaders in many different fields . . . attractive papers you can depend on for economy and production efficiency. We are constantly developing even more varieties, in spite of present conditions, for companies who join us in planning for the future. Write us now for information.

Riegel Paper Corporation • 342 Madison Avenue, New York 17, New York.

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Riegel **TAILOR-MADE PAPERS FOR PROTECTIVE PACKAGING**

No ONE chain serves every purpose

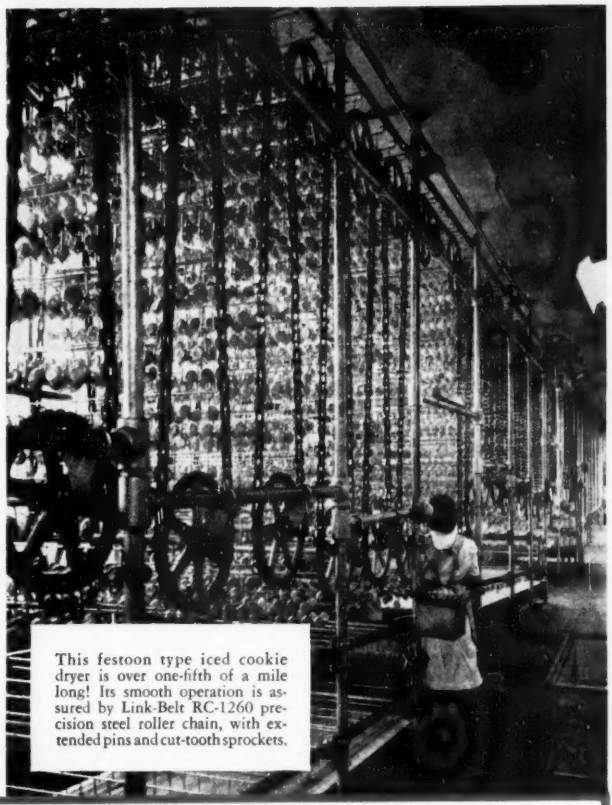
LINK-BELT offers a SPECIFIC chain
. . . to match your SPECIALIZED needs

There's just *one* type of chain that *best* meets the requirements of any given job. And no "general purpose" chain can do it as well. From the world's most complete chain line, Link-Belt engineers can recommend the *right* chain for your requirements. Large or small, Link-Belt builds them all.

Get longer life!

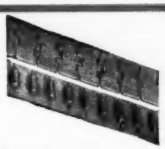
Remember, too — when you see a chain with the Link-Belt trademark, you can be sure it's made to the highest standards. Link-Belt's modern plant facilities assure greater refinements of manufacture. Exact control of materials and processes gives increased uniformity . . . longer chain life.

12,325-E

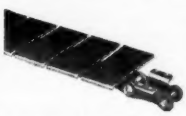


This festoon type iced cookie dryer is over one-fifth of a mile long! Its smooth operation is assured by Link-Belt RC-1260 precision steel roller chain, with extended pins and cut-tooth sprockets.

TYPICAL CHAINS from the COMPLETE LINK-BELT line



S-815 flat top conveyor chain—economical, sturdy, reliable, easy to detach and to keep clean.



Class RC flat top chain — precision made for smoothest, spill-free carrying and long life.

Class 400 swivel chain — carries cartons, cases, etc. over paths with both vertical and horizontal turns.

Class RC crescent flat top chain—travels in horizontal planes, around corners; ideal for bottles and cans.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, factory branch stores and distributors in principal cities.

LINK-BELT

CHAINS AND SPROCKETS

New G-E equipment saves Oscar Mayer $750 per week!

Better steam extraction, plus proved reliability of old turbine, determines midwest meat packer's choice of new G-E unit

As part of a plant expansion program, Oscar Mayer & Co., meat packers, early in 1950 increased the power-system capacity of its Madison, Wisconsin packing plant by installing a General Electric 3000-kw turbine-generator and metal-clad switchgear assembly. An important factor in their decision was the performance of an existing G-E turbine-generator in the plant. In 10 years of continuous operation, this unit has needed only two minor repairs. That's reliability!

Running 16 hours per day, the new G-E turbine-generator provides more efficient steam utilization, supplying extra process steam and electric power. As a result, it saves about 100 tons of coal per week at $7.50 per ton, or $750 per week. That's savings!

If the economics of *your* food-processing operation justifies co-ordinating generation of power with production of process steam, you too will want the reliability and savings that G-E power-system equipment can give you. Ask your G-E food-industry specialist to discuss your modernization or expansion needs—early in your planning. Meanwhile, write for Bulletin GEA-3277 "Turbine-generators." *General Electric Company, Schenectady 5, New York.*

POWER SYSTEM EQUIPMENT

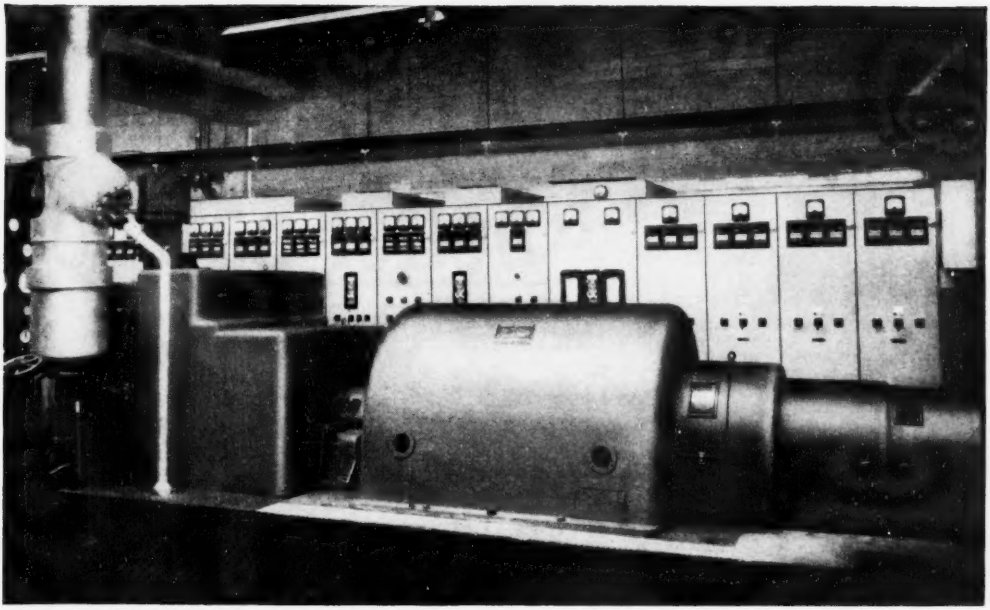
FOR

food plants

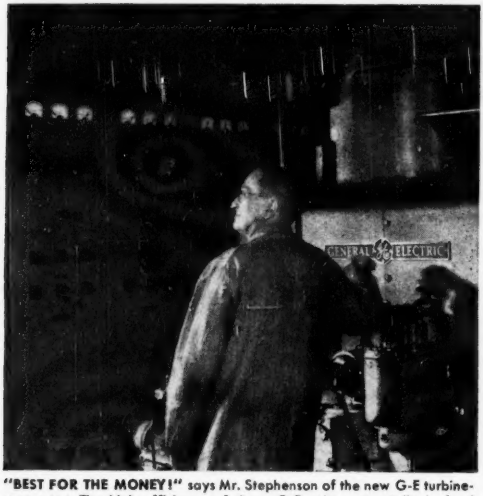
NEW!

G-E Motor Course helps train your food-plant workers

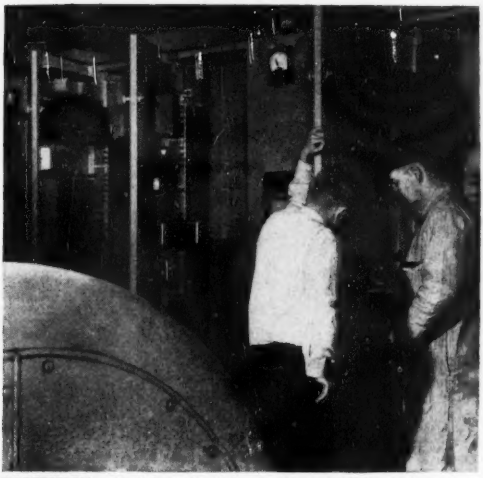
General Electric's new Motor Selection and Application Course is timed to meet today's need for more motor know-how on the part of your employees. A G-E "More Power to America" program, it pictures clearly and simply how motors work, types now in use, and practical pointers on selecting and applying them for specific jobs. Complete kit includes instructor's manual, 9 slidefilms with records, student review booklets, and sturdy carrying case. Ask your G-E representative for a free copy of the manual. For more information on the course, send for Bulletin GEA-4938-16.



BETTER EXTRACTION PERFORMANCE is obtained from this new G-E 3000-kw turbine-generator than from the previous unit, according to Mr. E. B. Stephenson, chief operating engineer of the Oscar Mayer plant in Madison, Wis. The unit, together with the G-E metal-clad switchgear in background, was recently installed as part of a plant expansion program.



"BEST FOR THE MONEY!" says Mr. Stephenson of the new G-E turbine-generator. The high efficiency of these G-E units—especially in food plants where they help co-ordinate the production of process steam with the generation of electric power—provides maximum output per dollar of fuel cost.



PROTECTION against short circuit damage is provided for packing-plant equipment by the new G-E metal-clad switchgear assembly. Factory wired and assembled, these units are quickly and inexpensively installed, permit expansion within existing buildings by their space-saving compactness.

GENERAL ELECTRIC

652-10

recipe... for more & better batches

RECIPE
1. Take one Yarway Impulse Steam Trap of proper size and capacity.
2. Install on cooking kettle.
3. Turn on steam . . . and cook.

A lot of plants are using the above recipe . . . and finding *it pays in production.* For instance—at a large west coast food preserving company, trap troubles spoiled many batches. Two years ago they ripped out the old type traps and installed Yarway Impulse Traps.

Today the Plant Engineer says, "Due to the fact my kettles heat up faster and maintain an even heat with Yarways, I have been able to produce at least two batches more per week than I did before. Since using Yarways I haven't had a batch spoil."

Yarway Impulse Traps are *designed* to increase production . . . *by getting equipment hotter, sooner and keeping it hot!*

Plus these other advantages—small size, easy hook-up, one moving part, low upkeep, low cost, stainless steel construction, good for all pressures. More than 200 conveniently located distributors have already sold over 750,000 Yarway traps to users in every industry. See *your* distributor today.

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

FREE TRAP SELECTOR — Just as necessary as the right steam trap, is putting the right trap in the right place. Yarway's 20-page Selector quickly tells you how. Write for free copy.

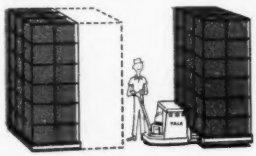
YARWAY

the steam trap designed with more production in mind

SQUEEZE PLAYS... *that save ... you money!*

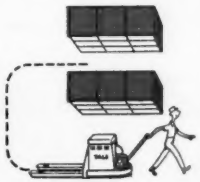
SAVE SPACE!

Thousands of square feet of it in aisles alone! Yale's Worksaver needs less room to work in so you gain valuable extra space for storage and production.*



**SAVE TIME!*

You can quickly work heavy loads with this shorter, lighter, more maneuverable Worksaver, cut costs on jobs bigger trucks can't get at.



SAVE MANPOWER!

One man at the steering handle can free an entire gang from the "sweat, strain and sprain" of heavy hand lifting.

"WALK IT OR RIDE IT!"

*Consider this saving before building new facilities.

Eliminate waste on hard-to-get-at jobs with these YALE WORKSAVERS

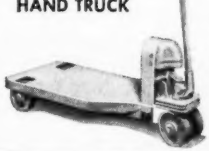
SAVE SAVE SAVE—that's the story of YALE'S Stubby Worksaver!

These pallet or platform trucks squeeze into small spaces to do big moving and lifting jobs... open up whole new areas of your plant to faster, more efficient materials handling... *cut your time and labor costs as much as 75%!*

The Yale Worksaver is a rugged trouble-free truck, too! A powerful electric drive unit, hydraulic lift and welded steel frame keep it on the job for years with a minimum of servicing.

Here's another YALE "expert" at cutting your costs

YALE
EASY-LIFT
HAND TRUCK



...Use it for short hauls, or in combination with Yale power trucks. YALE Easy-Lift makes it a cinch to lift and move heavy loads. It's light, maneuverable, sturdily constructed.

Send this coupon today!

YALE & TOWNE

The Yale & Towne Manufacturing Co., Philadelphia 15, Pa.

In Canada write The Yale & Towne Mfg. Co., St. Catharines, Ontario.

THE YALE & TOWNE MANUFACTURING CO., Dept. 489
Roosevelt Boulevard & Haldeman Avenue, Philadelphia 15, Pa.

I am interested in cutting my materials handling costs.

_____ *Please send me free "Worksaver" literature.*

_____ *Please send me free literature on Hand Trucks.*

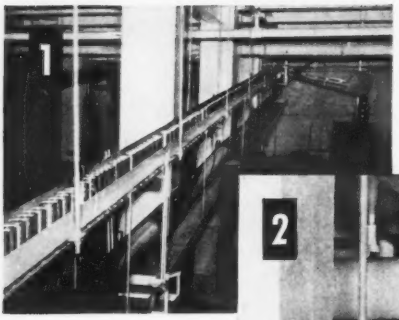
Name_____

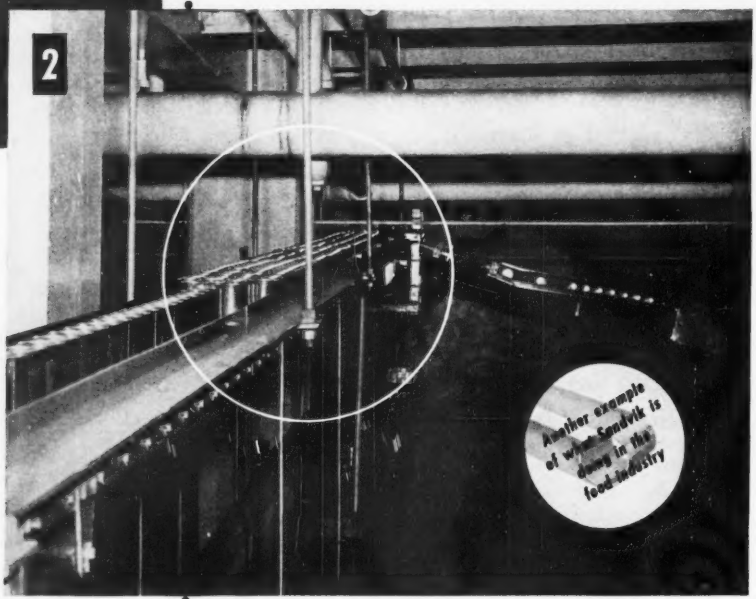
Company_____

Street_____ City_____ State_____

YALE is the registered trademark of The Yale & Towne Manufacturing Co.

Easier-Sliding Simplifies Can Handling On This SANDVIK STEEL-BELT CONVEYOR





1 Here are cans of Hershey's chocolate syrup carried by a Sandvik steel-belt conveyor. Normally, they move in single file to the take-off point.

2 But, when there's a delay... the cans keep coming, close ranks, form a column of four and mark time... with the smooth, Sandvik belt sliding easily under them until the take-off operation catches up. At times, there are four can columns, 60 feet long, marking time on the moving belt.

The smooth, low-friction surface of the solid steel band gives a Sandvik conveyor a special advantage for handling cans. They can be very easily slide-handled as they ride on the moving belt. This facilitates automatic storage en route and simple, slide-off discharge at any point with a minimum of belt wear. When extra "slide-ability" is required, the surface of the band can be lubricated.

SANDVIK STEEL BELT CONVEYORS

SS-71

Can You Improve Your Food Handling Operation With A Sandvik Steel-Belt Conveyor?

In addition to can conveyors, Sandvik supplies steel-belt units for handling a wide variety of foods, in various stages of preparation. These include meat, fish, vegetables, fruits, sugar, bakery products (on bake oven bands), margarine, candy, etc.

Why not look over your operation. See if there might be a place where the easy-to-keep sterile surface of a solid, stainless or carbon steel band could save money or step up production. Then, ask Sandvik for their engineering help and advice.

Sandvik builds complete conveyors to fit specific applications and provides engineering service to insure satisfactory operation. Belts can be of any length or width.

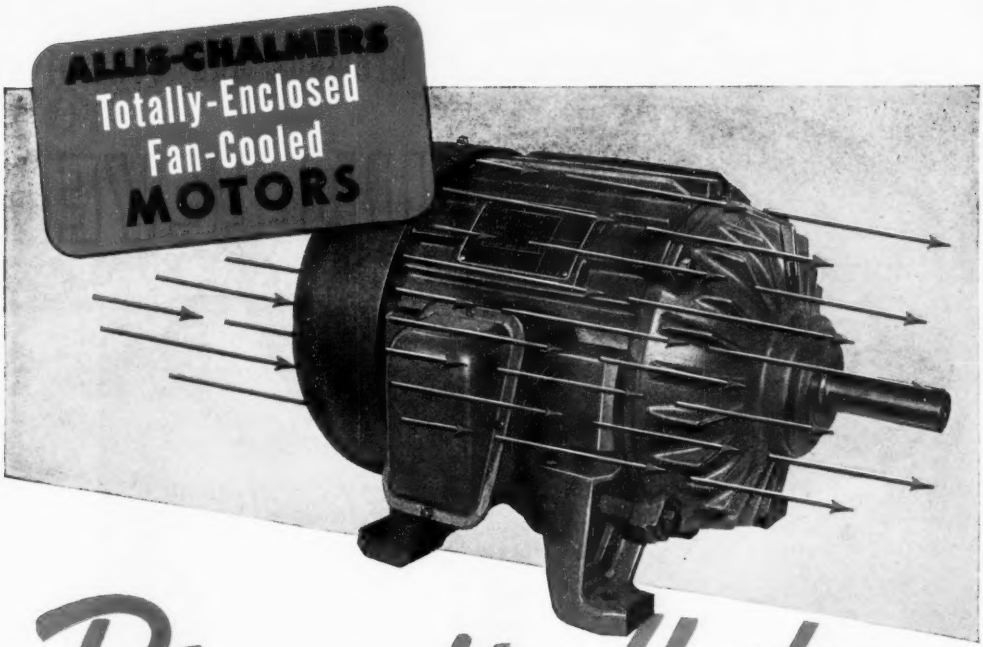
Write, wire or phone for further information.

SANDVIK STEEL, INC.

Conveyor Division

111 EIGHTH AVE., N.Y. 11, N.Y., WAtkins 9-7180

Manufacturers of steel-belt conveyors for over thirty years.



Blows itself clean as a Whistle!

DIRT IS CARRIED AWAY by cooling air blown over the ribbed cast iron frame and bearing housings of this new Allis-Chalmers tefc motor. That means less motor cleaning . . . inspection . . . overhaul!

Concealed air passages and pockets have been eliminated. Dirt can't build up to cause overheating. And as for oily dirt that sticks — just wipe or blow it off.

Studies show that on most applications, totally-enclosed fan-cooled motors more than pay back their extra cost in reduced maintenance. And this new Allis-Chalmers Type APZ tefc motor makes maintenance costs lower than ever before.

Rigid Construction

The frame is cast iron which has high resistance against corrosion and distortion. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment.

Get All The Facts

The new Allis-Chalmers Type APZ totally-enclosed fan-cooled motor is built in all NEMA standard frame sizes from 224* to 505. Also in explosion-proof type. Your A-C Authorized Distributor or District Office has complete information. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.

A-3427

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

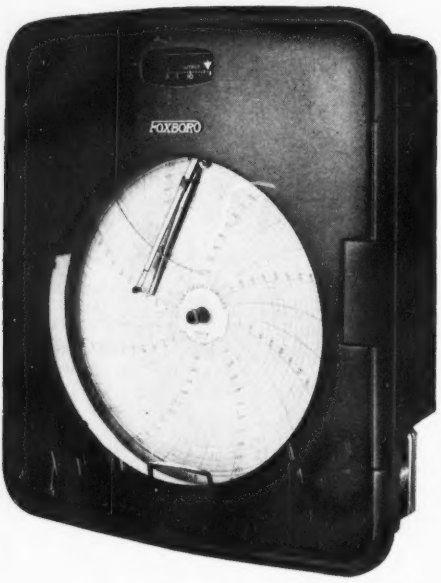
Texrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

*Similar design non-ventilated motors Type APK, also available in frames 203 to 224 inclusive.

better measurement and control of

LIQUID LEVEL



In the measurement or control of liquid level — whether your problem involves turbulent, viscous or corrosive liquids, open tanks or closed pressure vessels — Foxboro offers complete diversity of premium-quality instruments to meet the requirements . . . and unmatched application experience to guide specification or design of the most efficient system for your operation.

INDICATORS • RECORDERS • CONTROLLERS
diaphragm, bubble tube, float, and differential pressure measuring systems for open or closed vessels
PNEUMATIC OR ELECTRONIC TRANSMISSION
• CONTROLLED VALVES

FOXBORO
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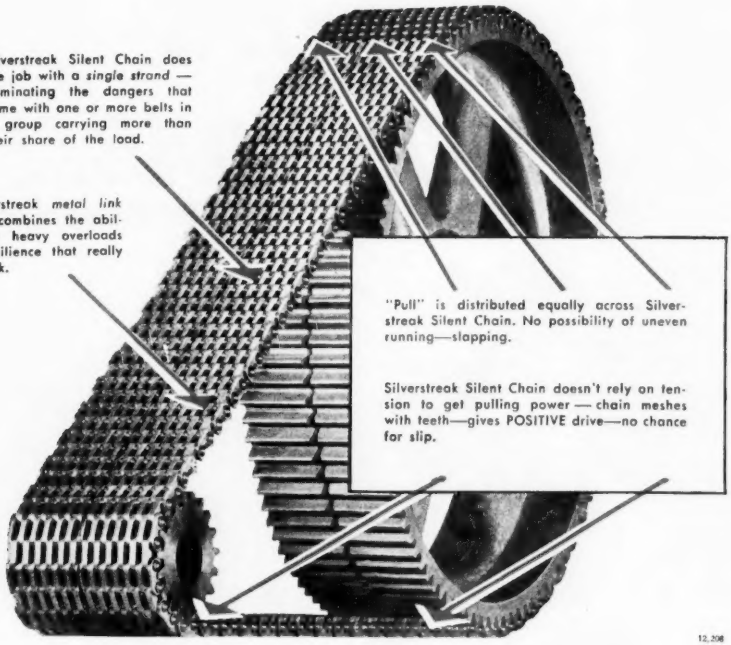
For over 40 years, specialists in the measurement and control of temperature, pressure, flow, liquid level, humidity . . .

THE FOXBORO COMPANY • FOXBORO, MASSACHUSETTS, U.S.A.

SLIP-PROOF
SLAP-PROOF
SHOCK-PROOF


Silverstreak Silent Chain does the job with a *single strand* — eliminating the dangers that come with one or more belts in a group carrying more than their share of the load.
Husky Silverstreak *metal link* construction combines the ability to carry heavy overloads with the resilience that really absorbs shock.
"Pull" is distributed equally across Silverstreak Silent Chain. No possibility of uneven running—slapping.
Silverstreak Silent Chain doesn't rely on tension to get pulling power — chain meshes with teeth—gives POSITIVE drive—no chance for slip.
12,208

Get Full RPM Transmission With LINK-BELT Silverstreak Silent Chain Drives

Yes, get the amazing, trouble-free efficiency of 98.2%. A standard of operation that continues throughout the long, long life of the drive. More than this — every rating and design is backed by a record of *proven performance.* And every chain is engineered for the job. You conserve space, too — for Link-Belt Silverstreak Silent Chain Drives operate efficiently on short centers. Ratios as high as 10 to 1 are commonly used.

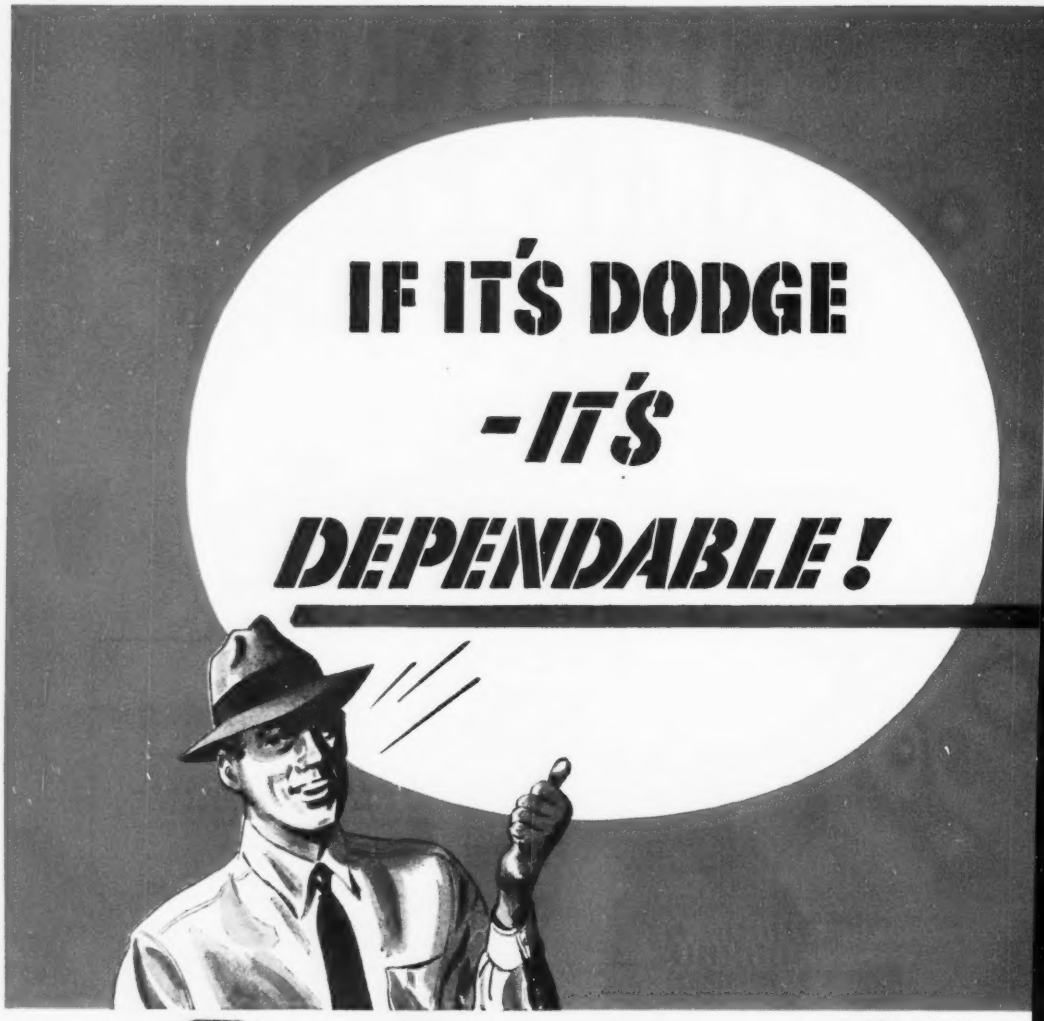
Little wonder, then, that so many concerns to whom top operation efficiency and rugged dependability are a must, standardize with Link-Belt Silverstreak Silent Chain Drives.

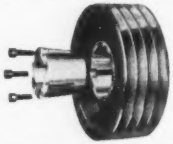
LINK-BELT COMPANY, Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES

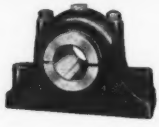
IF IT'S DODGE -IT'S DEPENDABLE!



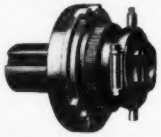


TAPER-LOCK SHEAVES: Patented. Taper-Lock is the world's simplest mechanism for mounting wheels to shafts. Easy on—easy off! 476 stock sizes in A, B, C and D grooves.

TORQUE-ARM SPEED REDUCERS: America's most complete line of shaft mounted speed reducers. Capacities from 1 to 27 h.p. Output speeds from 12 to 330 r.p.m.



DODGE-TIMKEN BEARINGS: Mounted units, proved in millions of industry's toughest jobs. The famous 30,000-hour line. Four types to choose from. Sizes from 1-3/16" to 8".



ROLLING GRIP FRICTION CLUTCHES: No toggles! Compact, flexible, smooth and DEPENDABLE. Bolted plate and gear tooth plate. 1.3 to 21.2 h.p. at 100 r.p.m.

SLEEVOIL BEARINGS: Precision built, exceptionally quiet, thoroughly dependable. "Tops" for fan and blower service. Sizes 1-7/16" to 8" in both plain and water cooled types.

SOLID STEEL CONVEYOR PULLEYS: Maximum strength, minimum weight. *Modern* pulleys with interchangeable hubs that cut installation cost. Diameters 6" to 8'. All face widths.

DODGE SEALED-LIFE V-BELTS: Special protection for tension members insures longer belt life. Perfectly matched to Taper-Lock sheaves for best performance.

DODGE TAKE-UPS: Modern, rugged, dependable. Roller bearing (illustrated), ball bearing and babbitted. Shaft sizes from 3/4" to 4". Travel from 4" to 36".

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NOTED THROUGHOUT THE WORLD FOR HIGH QUALITY, PRECISION MANUFACTURE

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MANUFACTURERS OF A BROAD LINE OF MECHANICAL POWER TRANSMISSION MACHINERY

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ORIGINATORS OF NEW AND BETTER PRODUCTS FOR THE MECHANICAL TRANSMISSION OF POWER

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USED CONFIDENTLY WHERE THE GOING IS TOUGHEST

DODGE MANUFACTURING CORPORATION, 2800 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER: Most Dodge products are normally available from distributors' stocks — in your territory — when you need them. For information on the newest and best methods of mechanical power transmission, call the Dodge Transmissioneer, graduate of the Dodge factory course. He is your local Dodge Distributor. Look for his name under "Power Transmission Equipment" in your local classified telephone directory.

ILLOW BLOCKS: Roller Bearing, Ball earing, Babbitted. **FLANGE BEARINGS:** oller, Ball, Babbitted. **HANGER BEARNGS:** Roller, Ball, Babbitted. **TAKEPS:** Roller Bearing, Ball Bearing, Babitted. **BASE PLATES. FLOOR STANDS. ROP HANGERS. V-BELT SHEAVES:** oth TAPER-LOCK and Bored-to-Shaftize. **BELTS:** Industrial and FHP V-Belts d Flex-Link Belting. **SPEED REDUCRS:** TORQUE-ARM Shaft Mounted peed Reducers. **CLUTCHES, FRICION:** Rolling Grip, Diamond D and olid Types. **COUPLINGS:** TAPERCK Flexible, TAPER-LOCK Rigid d Flange Types. **SAFETY SET COLARS. PULLEYS:** Steel Split Transmison and Solid Steel Conveyor Pulleys. ubber Lagging. **VISES:** SLIDE-SET achinist's...FOR COMPLETE LINE, YPES AND SIZES, WRITE FOR BULETINS AND 224-PAGE CATALOG.

DODGE

of Mishawaka, Ind.

"First in Power Transmission Machinery!"

NABISCO

selects SARCO

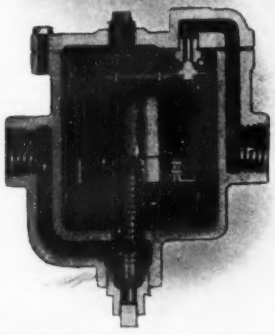
For LARGEST BAKERY on the Pacific Coast

This beautiful, modern bakery just completed by National Biscuit Company in Portland, Oregon, features many innovations. For example, the large tower at left is designed for the storage of raw materials. Each baking unit measures over 600 feet from cutting machine to packing department. The new plant greatly augments NABISCO's service to food merchants and consumers in the expanding Pacific Northwest.

Four types of SARCO STEAM TRAPS are used

Sarco furnished, for the heating system, four different types of steam traps, including a large number of the inverted bucket type as illustrated.

Efficient steam trapping, of course, depends upon the selection of the right type of trap for the particular job. Sarco is the only manufacturer offering a selection of four major types of steam traps, namely: inverted bucket, thermostatic, float-thermostatic and liquid expansion. Write for trap selection chart No. 1600.



SARCO INVERTED BUCKET STEAM TRAP

Since 1936 made with built-in strainer.
All mechanism on cover for easy inspection.

No. 334

Engineers & Architects: Ford, Bacon & Davis, New York.
Contractors: Buchanan Co., Inc., Portland, Oregon

SARCO SAVES STEAM

SARCO COMPANY, INC.
Represented in Principal Cities
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SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

fortify your foods with

Vitamin A...

fortify yourself against competition!

IF you're searching for a new selling point to put your products out in front, vitamin A may well be your answer.

DPi Vitamin A is lower in price now than it has been in years, while stability and freedom from objectionable taste and odor are at an all-time high. That's the result of DPi's constant improvement of the unique molecular distillation process for natural vitamin A and DPi's pioneering research that made possible Myvax* Synthetic Vitamin A esters.

Which is best for your kind of product? We'll be glad to go into the details with you thoroughly and show you how Myvapack* Vitamin A Concentrate in pre-measured sealed cans simplifies mixing problems. Write ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: 570 Lexington Avenue, New York 22, N. Y. • 919 N. Michigan Ave., Chicago 11, Ill. • W. M. Gillies and Company, Los Angeles and San Francisco • Charles Albert Smith Ltd., Montreal and Toronto.

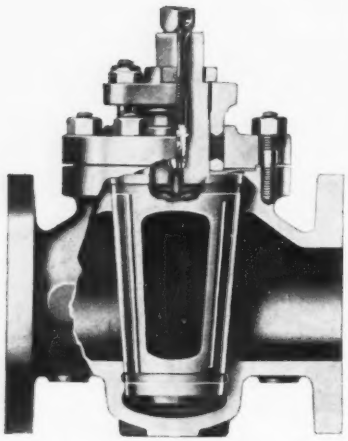
DPi

leaders in research and production of both natural and synthetic vitamin A

Also . . . high vacuum equipment . . . distilled monoglycerides . . . more than 3400 Eastman Organic Chemicals for science and industry.

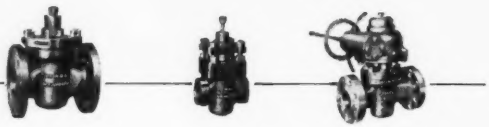
*Trade-mark

WALWORTH
Lubricated
Plug Valves



for TOUGH assignments

where tight shut-off...
and easy operation
are "MUSTS"



Walworth Lubricated Plug Valves Offer These Advantages

- Complete surrounding of ports with resistant lubricant affords positive seal against leakage.
- Lubricant grooving system assures ease of operation — tight shut-off — greater protection against corrosion.
- Body and plug fully protected by lubricant from attack by line fluids.
- Quarter turn opens or closes valve.
- Made in a complete range of sizes ½" to 26" and for pressures from 175 to 5,000 psi., and for vacuum requirements.

For handling petroleum products, natural or manufactured gas, acids, alkalies, solvents, slimes, slurries . . . in fact for almost any hard-to-handle liquids—there's a Walworth Lubricated Plug Valve designed for the job.

Easy to operate, tight sealing, resistant to wear and corrosion, Walworth Lubricated Plug Valves assure long years of dependable service at low operating cost.

Walworth Lubricated Plug Valves are available in sizes ½" to 26" for pressures from 175 to 5,000 psi., and for vacuum requirements. For full details—prices, sizes, dimensions, and other pertinent data, see your Walworth distributor or write to:

WALWORTH

valves • fittings • pipe wrenches

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DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

no food processor can afford to overlook

MAGNA Spice CONCENTROLS

THE MM&R BRAND OF SPICE ESSENTIAL OILS

complete in-plant control of seasoning uniformity

cut food seasoning costs 20%-40%

Hundreds of meat packers and other food processors, small, medium and large, have

PROVED *that the MM&R method makes it possible to rack up big savings . . . month after month!*

PROVED *that the MM&R method of seasoning provides complete in-plant control of uniformity!*

May we show you how you can obtain these advantages *without* changing the flavor of your product? Write to the MM&R Food Technology Dept. today — no obligation.

*T. M. REG. APPLIED FOR
® MM&R, MAY 1951

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SINCE 1895 . . . ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

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SAN FRANCISCO: BRAUN-KNECHT-HEIMANN CO.

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Orange Oil that Surpasses
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AMERICAN U.S.P.

with the Magna-fied true-orange flavor

Think you are using the best Orange Oil now? Then keep an open mind while you try MAGNA ORANGE OIL – the Orange Oil that gives you *maximum* uniformity, *maximum* solubility, *maximum* flavor trueness! Your first trial batch will prove to you what *thousands* of users have already discovered – that MAGNA ORANGE OIL is *surprisingly better!* Surprising, too, how *much* you save when you specify MAGNA ORANGE OIL. Write for complete information and schedule of prices.

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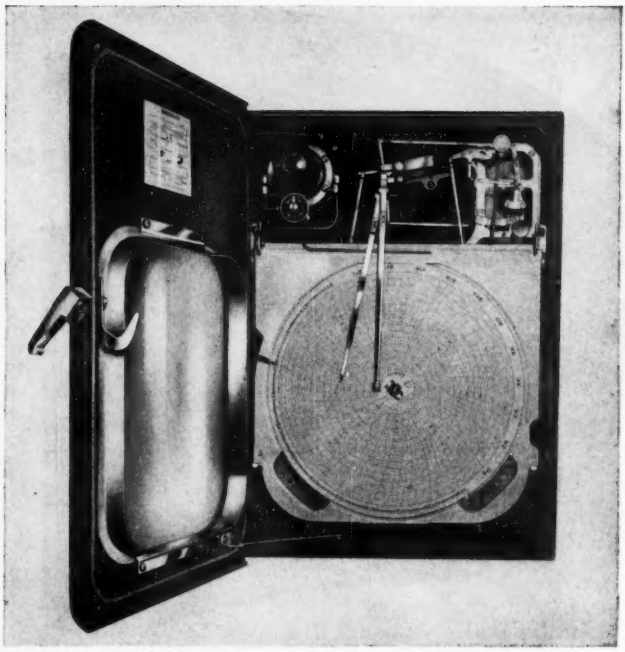
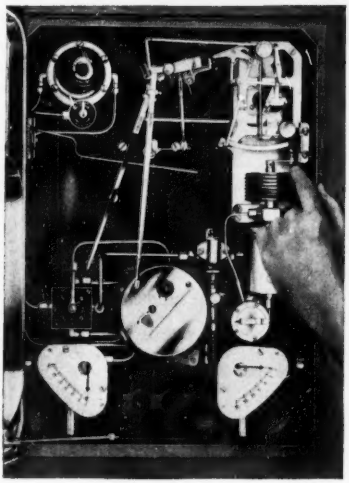
Anybody Can Take Care of a BRISTOL SERIES 500 CONTROLLER



Plant operating men quickly become familiar with it . . . and like to use it

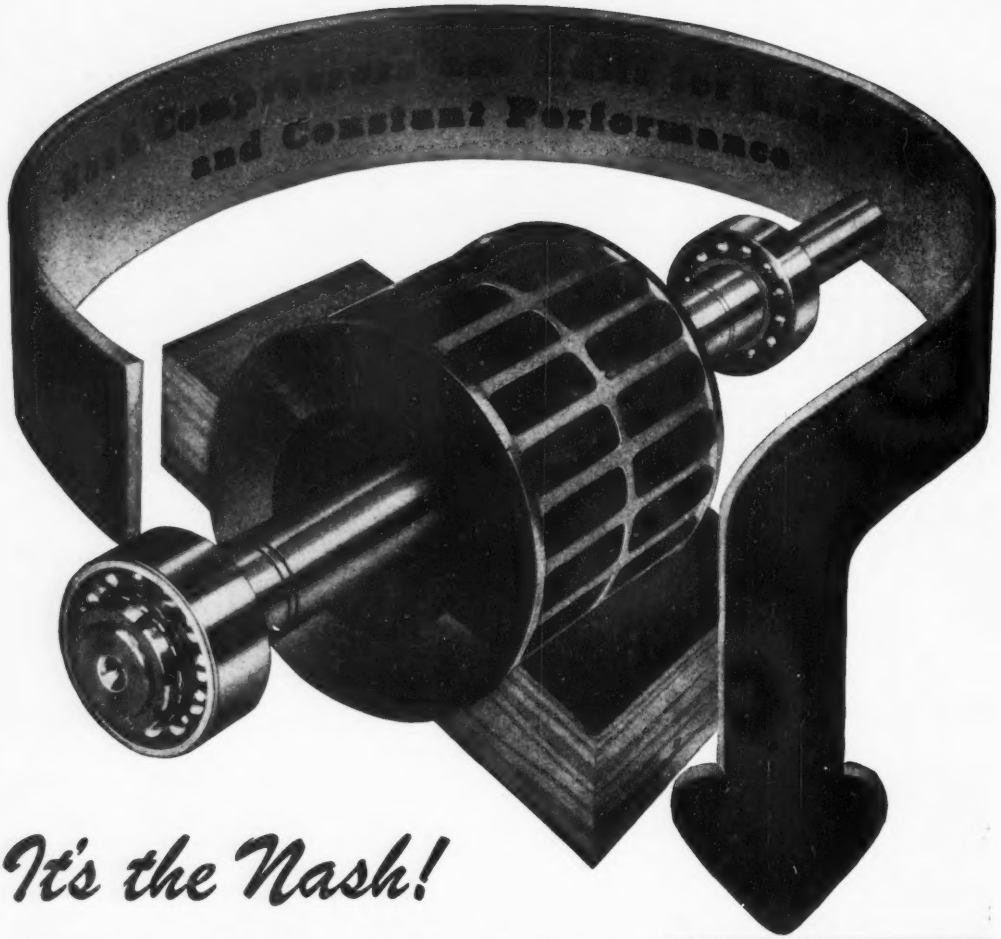


Only One Simple Adjustment

Write or call your local Bristol representative. And write for Bulletin A120. THE BRISTOL COMPANY, 115 Bristol Road, Waterbury 20, Conn.

BRISTOL

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature Automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

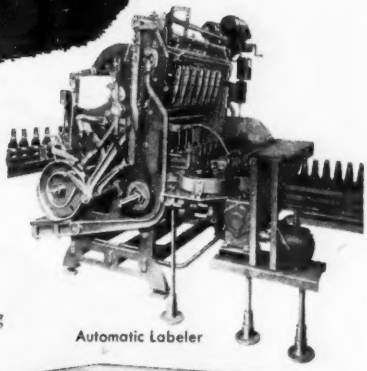
NASH ENGINEERING COMPANY

284 WILSON, SO. NORWALK, CONN.

Announcing

The EDWARD ERMOLD Division of BARRY-WEHMILLER Machinery Company

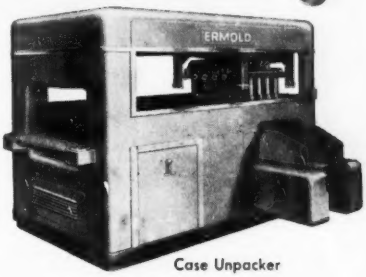
Adding Ermold Labelers and Unpackers to the B-W Line



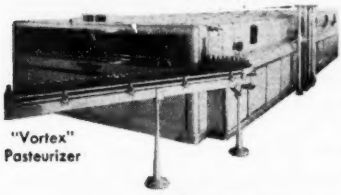
Automatic Labeler

The Barry-Wehmiller Machinery Company has acquired all physical assets (except land and buildings) of the Edward Ermold Company. This business will continue to be conducted in the existing offices at 652 Hudson St., N.Y.C., and will be known as the Barry-Wehmiller Machinery Company, Edward Ermold Division.

Now Ermold automatic bottle labeling and unpacking equipment joins the Barry-Wehmiller line of bottle cleaners, pasteurizers, processors, and "Bruceway" can uncasing and marking machines—thus enabling B-W to be of greater service to the industries it serves.



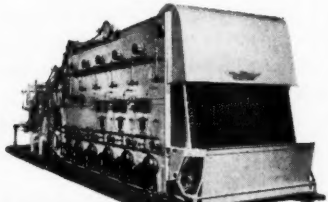
Case Unpacker



"Vortex" Pasteurizer

Since 1885 Barry-Wehmiller has continued to pioneer in the design and development of bottling and food processing equipment and, the acquisition of the Ermold line is further evidence of its progressive leadership.

Early in 1951, B-W formed a British affiliate, Barry-Wehmiller Machinery Company, Limited, located in London and Bristol where manufacture of "Vortex" Pasteurizers has already begun.



"Super-National" Bottle Cleaner

Barry-Wehmiller is proud of its part in the development of modern, efficient equipment for the industries which it serves—proud, too, of the recognition accorded its equipment now operating in more than 40 countries around the world. Write to Barry-Wehmiller concerning your automatic bottling or food processing requirements.

THE SUN NEVER SETS ON B-W BOTTLE CLEANERS PASTEURIZERS & PROCESSORS

BARRY-WEHMILLER Machinery Co.

268

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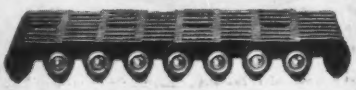
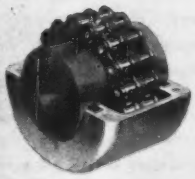
UNION CHAIN
is at your service

UNION ROLLER CHAIN



UNION SILENT CHAIN



UNION
ROLLER CHAIN
FLEXIBLE COUPLINGS

UNION
SILENT CHAIN
FLEXIBLE COUPLINGS

Suppose You Need a UNION Heavy Duty Chain

... for a drive or conveying application where heavy loads, slower speeds, long life and moderate cost are factors. Union Chain manufactures a complete line of these heavier types of chains, sprockets, flights and aprons, in addition to roller chain and silent chain, and is therefore in a position to make competent, unprejudiced chain recommendations.

Furthermore, an important phase of Union's service to its customers is the designing and building of special chains for unusual applications, particularly for conveying and elevating. Union is in an unusually fortunate position to render such service since we manufacture steel chains of all types and nothing else. This specialization has given us an unusual insight into problems of power transmission and conveying which our customers find valuable to them.

Perhaps we can be of help to you. Your inquiry will be welcomed.

TYPICAL UNION DRIVE AND CONVEYING CHAINS

HB STRAIGHT SIDE BAR ROLLER CHAIN

BRIDGE CHAIN

BP CHAIN

BP ICE CHAIN

HB STRAIGHT SIDE BAR BUSHING CHAIN

COMBINATION MALLEABLE IRON AND STEEL CHAIN

APRON CONVEYOR STYLE A

APRON CONVEYOR STYLE B

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Sandusky, Ohio, U.S.A.

Economical GAS Supplies delicious SPUDNUTS Fresh Each Day

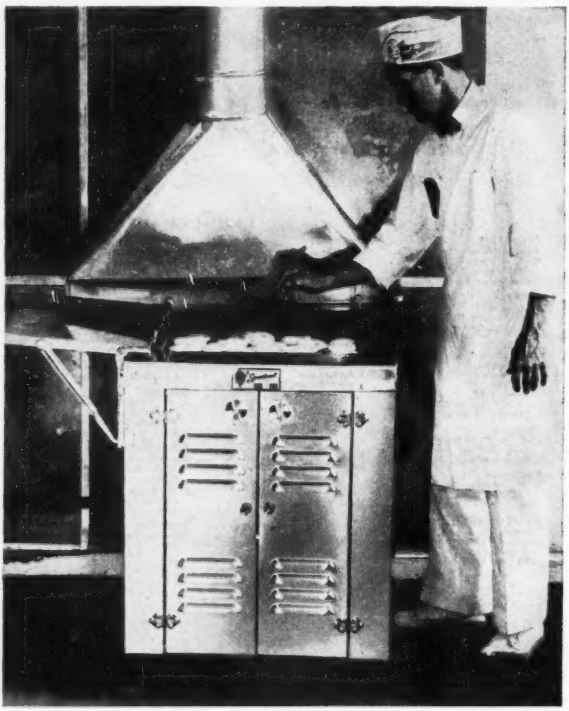
Home of Pelton's Spudnuts, Inc., Salt Lake City. Pilot plant and test shop is in right side of building.

"Less maintenance cost, lower operating costs," say Al and Bob Pelton about the advantages of modern Gas Equipment for baking. The Peltons, Co-Presidents of Pelton's Spudnuts, Inc., Salt Lake City, started with a new bakery idea 10 years ago, and turned it into a top-selling specialty.

Spudnuts have a potato base, and an exciting flavor all their own. Since 1940 the company has grown from 1 to nearly 300 shops in the U. S., with shops also operating in Alaska. The Peltons use Gas, not only to bake the light, fluffy Spudnuts perfectly, but to fire the Gas water heater, the Gas overhead heaters and the Gas furnace. Their model Test Shop with the Gas-fired Spudnut fryer is a research plant for study and improvement of Spudnuts.

GAS provides an economical, dependable way of baking for Al and Bob, and keeps maintenance costs low. Gas can do your baking better, too, because you get the exact temperatures you want, when you want them, with Gas. The cleanliness and thriftiness of Gas will appeal to you. Find out about Modern Gas Equipment from your Gas Company Representative —call him today!

Modern Gas fryer manufactured by Anetsberger Brothers, Inc., Northbrook, Ill.



Mr. Max Baker, Spudnut Corporation's Test Shop Manager, turns Spudnuts in their new Gas fryer.

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK

are your profits losing weight

...on a diet of damaged freight?

At last something has been done about the high amount of freight damage that last year ran to more than 100 million dollars!

Pressed Steel Car Company, pioneer manufacturer of railroad equipment, designed and built a cellular laminated car that ideally meets the special requirements of the food industry! Thoroughly tested and proved, it is superior in every way to the equipment now used by the railroads!

as a freight car it's

Unicel

as a refrigerator car it's

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Just add a refrigerating unit . . . special insulation . . . circulate a blanket of cold air around an inner wall . . . and there you have it — UNITEMP, a refrigerator car that maintains a more even temperature and keeps condensation and dehydration to a minimum. Heat can be provided to protect perishables from cold during winter months!

Safer and stronger than old fashioned cars, UNICEL transmits 66% less-roadshock, delivers goods in first class condition!

BIGGER than conventional cars, UNICEL can carry *more* goods!

Wider doors permit UNICEL to be loaded and unloaded faster and cheaper!

Built-in Unistrapping safely secures loads *without dunnage!*

Free from cracks, pockets or corners, UNICEL is easier to clean and *keep* clean!

Shippers and Receivers of meat, grain, dairy produce, fruits, vegetables, canned goods and other foods will want to know more about Unicel and Unitemp. We invite you to send for complete information today!

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Stronger . . . safer . . . and money-saving, too!

CHEVROLET Advance Design TRUCKS

Strength to carry your loads . . . power to *move* your loads and *keep* moving them . . . extra features that add up to more service, safety, operating comfort and economy! These new Chevrolet trucks offer you more of the things that count on the job . . . more of the money-making, money-saving features you want and need on jobs that test a truck's real value. Check what Chevrolet trucks offer and see for yourself. Valve-in-head engines that squeeze more power from every drop of gas. Self-energizing brakes for extra stopping power—greater safety. Wide-base wheels for increased tire mileage. These new Chevrolet trucks even offer extra driver comfort—with new cab seats and Ventipanes. But learn all the facts now. See the new Chevrolet Advance-Design trucks at your dealer's today.

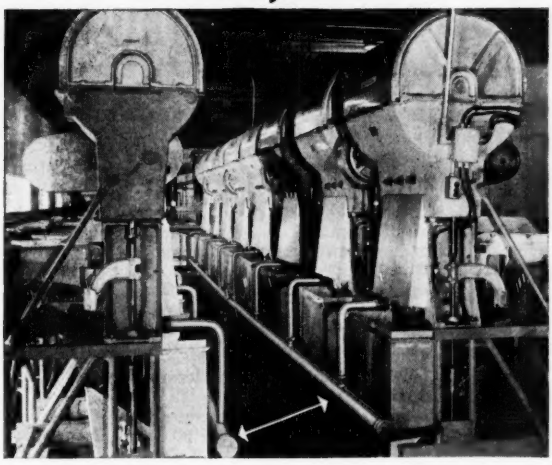
CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

CHEVROLET

ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR — for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSIONS — for fast, smooth shifting • HYPOID REAR AXLES—for dependability and long life • NEW TORQUE-ACTION BRAKES—for light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES — for medium-duty models • NEW TWIN-ACTION REAR BRAKES — for heavy-duty models • NEW DUAL-SHOE PARKING BRAKE —for greater holding ability on heavy-duty models • NEW CAB SEATS—for complete riding comfort • NEW VENTIPANES — for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGN BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

You Safeguard TASTE with lines made of *Carpenter* Stainless Tubing



As this plant's Superintendent would tell you, these 4" citrus juice lines safeguard the product's most important feature . . . its TASTE.

And in these days, when tubing or pipe may not always be in your plant when you'd like it, *long life* and *easy maintenance* become more important than ever before. That's what we mean when we say you get "more than corrosion resistance" from Carpenter Stainless Tubing.

When you want the sanitary advantages of Stainless, plus engineering or fabricating help that keeps processes going the way you planned them—put in a call to Carpenter, or your Carpenter Stainless Tubing Distributor. Our 23 years of experience with Stainless Tubing problems can be used to your advantage.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Dept., Reading, Pa. — "CARSTEELCO"

Carpenter
STAINLESS TUBING

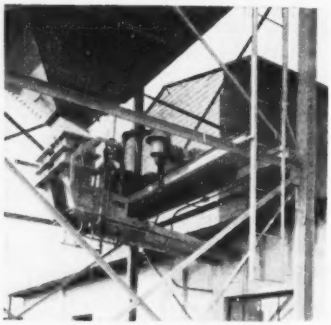
Analysis → Tolerance → Finish →

— guaranteed on every shipment

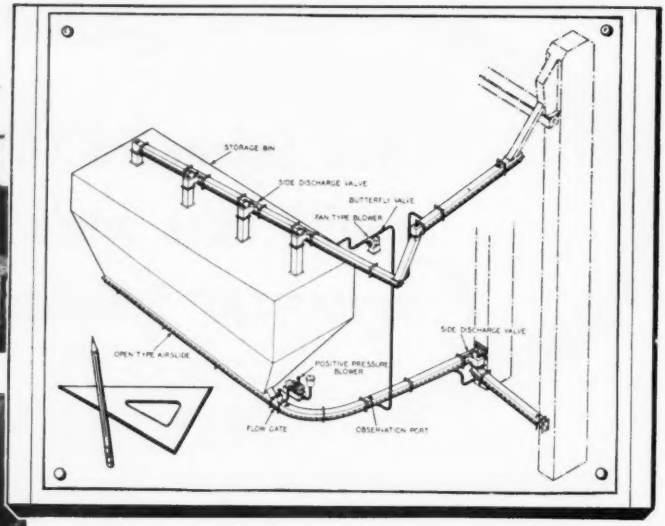
THE U.S. NEEDS YOUR STEEL SCRAP NOW

Conveying from elevator to storage bin underneath floor

Open-type Airslide in bin bottom conveying to elevator



Conveying from storage bin to weigh scales in plant



F-H AIRSLIDE® CONVEYOR you profit by

STARTING FROM SCRATCH

While your modernization program is in the planning stage, get **ALL** the facts about pneumatic conveying of fine, pulverized, and granular materials. Pneumatic conveyors permit economy and convenience in location of buildings and production equipment without the restrictions or straight-line limitations of mechanical conveyors. You'll save time, trouble, and money by pre-planning before installation of your conveying system.

Each job is unique. Each job requires individual study, an individual recommendation of the system best adapted to the purpose. Only specialists in the engineering and building of pneumatic conveying systems are fully equipped to make such recommendations.

Fuller is an organization of specialists in pneumatic conveying systems, and manufactures four basic types of conveyors, each designed to do a particular job in the most efficient and economical manner.

That's why we urge you to avoid possibly wasteful preliminary engineering—why we suggest you let us study your requirements and submit our recommendations, proposal drawings and estimates *before* you start construction. There is, of course, no obligation whatsoever.

Illustrated is the F-H Airslide, one of the four types of conveying systems we manufacture. It is a revolutionary conveyor, using low-pressure air which fluidizes fine, dry materials so that they flow—by gravity—like water. There are no moving parts—nothing moves but the material.

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FH-23

Make the most of this combination....

1. ***Continuing basic research . . .*** in corn products chemistry, directed by the foremost research men in the industry.

2. ***Technical and engineering services . . .**** to help you apply new methods and new products to your production setup. No obligation for on-the-spot studies. (Write our Technical Sales Department.)

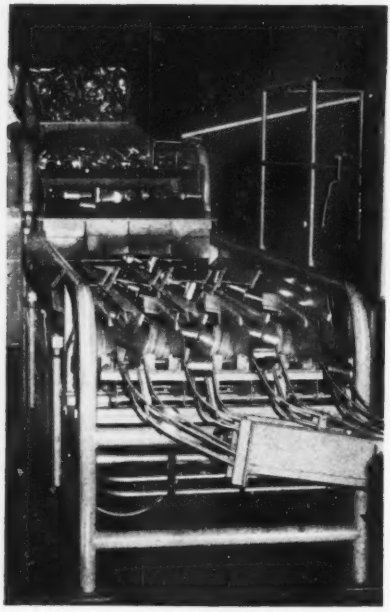
3. ***Fine products of uniform quality*** . . . from a dependable, large volume source of supply.

● Globe, Cerelose, Puritose, Buffalo and Hudson River are registered trade-marks of Corn Products Refining Company, New York, N. Y.

CORN PRODUCTS REFINING COMPANY, 17 BATTERY PLACE, NEW YORK 4, N. Y.

NOW

NATION-WIDE DISTRIBUTION OF THE "400" DUDLEY CAN UNSCRAMBLER



FAST... Easy Handling with Unlimited Efficiency . . . A Model to fit your size can and anticipated output.

GENTLE... Coordinated Action insures a smooth "Roll Off" . . . to elevator and labeler and your can is Unscrambled with never a dent.

ADJUSTABLE... in a matter of moments to fit any sized can. Yes, a Dudley "400" Can Unscrambler is like a woman, you can get along without one, but life is a lot more fun and a lot more liveable with one. Put this streamlined beauty in your production lines for fewer headaches—fewer backaches and more production, she is fast, gentle and adjustable and so easy to live with. Low upkeep, less labor cost, built for a life time of service.

DUDLEY MACHINERY COMPANY

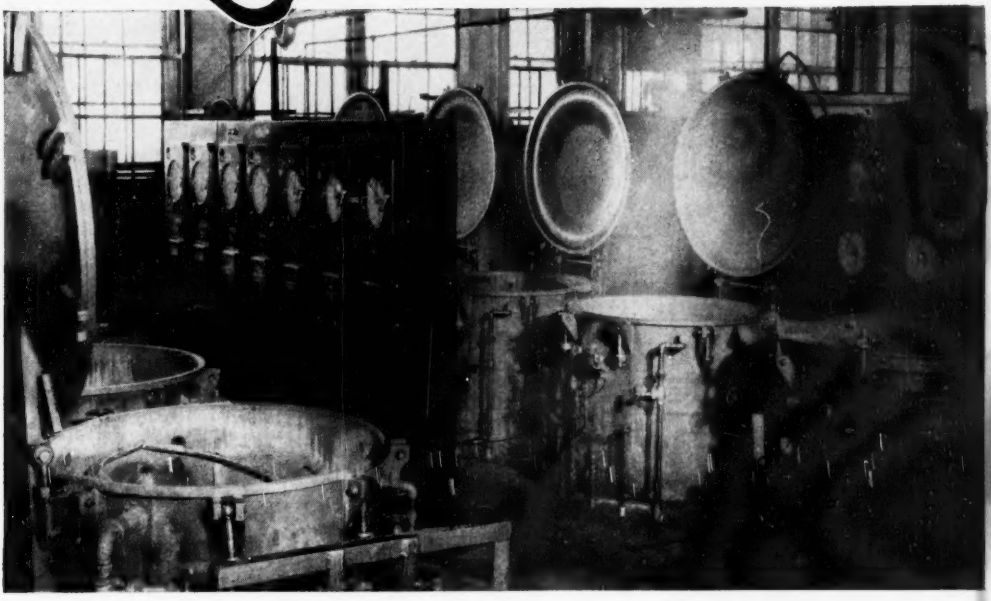
P.O. BOX 397
MOUNTAIN VIEW, CALIF.

OTHER DUDLEY PRODUCTS—*Can Unscrambler, Peach cup-down pan and shaker, Size Grader, Bag Filler, Corn Husker, Apricot pit shaker, separater and cup-up.*

REG. U. S. PAT. OFF.

Stokely's Finest

stay that way with Taylor Retort Control



Taylor's Centennial ACCURACY FIRST SINCE 1851

LATEST REPORTS from Stokely Van Camp, Inc., Indianapolis, tell us their new Taylor Retort Control System is maintaining uniform quality at a big cost saving. "This system is delivering automatic control of time, temperature and pressure for all size cans and jars and has better prepared us for the handling of government orders where, as in our civilian production, the interest is always on a quality product at a competitive price."

With this system, your operator simply loads his retort, turns a timer dial, and lets Taylor automatic control take over with:

Automatic temperature control at processing point.

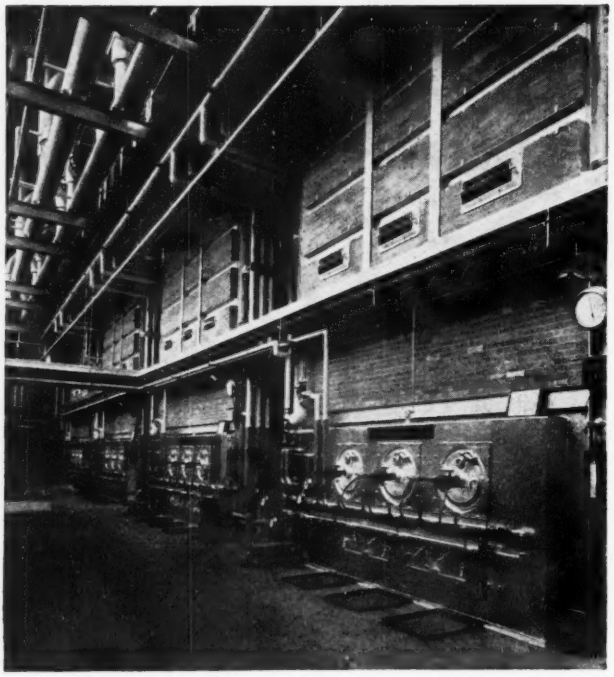
Automatic timing of process period with steam being automatically shut off at end of period.

Automatic pressure control during cooling by economical use of compressed air in retort.

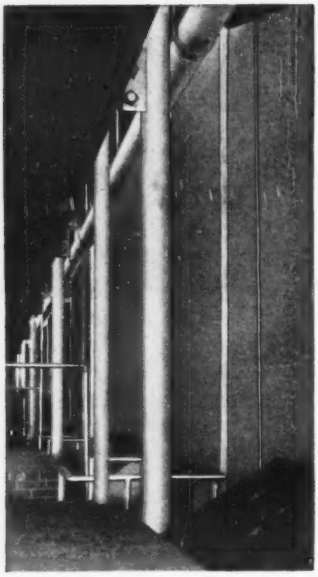
As it's doing for Stokely, Taylor Automatic Control can also save money for you. Ask your Taylor Field Engineer! Or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.*

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

Boiler room of Buffalo State Hospital, Buffalo, N. Y. All boilers, heated equipment, and steam lines are insulated with "Featherweight" 85% Magnesia. Cold water pipes insulated with K&M Duplex.



More than four and one-half miles of steam lines



Partial view of smoke breeching insulated with "Featherweight" 85% Magnesia 3" blocks and finished with Asbestos cement.

OWNER: State of New York
ARCHITECT: Cornelius J. White, State Architect
GENERAL CONTRACTOR: The John W. Cowper Co., Buffalo, N. Y.
HEATING CONTRACTOR: Quackenbush Company, Buffalo, N. Y.
INSULATION CONTRACTOR: E. J. Eddy, Inc., Buffalo, N. Y.

—insulated with "FEATHERWEIGHT"® 85% MAGNESIA

From the new boiler house of the Buffalo State Hospital, 24,000 lineal feet of piping carry steam throughout the institution. And, to guard against heat losses, the entire system—pipes, boilers, smoke breeching, and other heated surfaces—is insulated with "Featherweight" 85% Magnesia.

"Featherweight" 85% Magnesia provides efficient, durable insulation at a cost that insures savings. And the savings are continuous: "Featherweight" will last the life of your heating system!

Keasbey & Mattison "Featherweight" 85% Magnesia Insulation is made in blocks, laggings, and standard-size pipe coverings for all applications up to 600° F. Other K&M Insulations cover service ranges from 40° F. to 1900° F. Our local distributor, who is an experienced applicator, will be glad to give you complete information. Or, write us.

Nature made Asbestos . . .

Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

K&M best in asbestos®

How to Handle Perishables?
The Dairy People Agree 100%

THE handling and processing of milk and milk products is one of the nation's major industries —and a mighty delicate, painstaking business, too! But, if dairymen have never-ending problems of protecting flavor and purity, and of keeping maintenance and cleaning costs down, they also have a never-failing helper. It's Allegheny Metal.

For many years now, practically every item of equipment that has gone into a milk-processing plant has been made of stainless steel. From the receiving tanks to the bottle or package, and from one end of the country to the other, milk products today seldom come in contact with anything but stainless. As good businessmen, dairymen have found that nothing else can do the job as well. No other commercial metal is at once as strong, as corrosion resistant, as easy to clean and keep clean, and as lifetime-lasting in service.

The dairy and food industries, of course, class as essential uses for Allegheny Metal. There are many others: in the processing of chemicals, drugs and petroleum products, for example—and in planes, ships and many other vital items of defense equipment. Naturally, some less essential uses have to give way, but there are ways to spread the supply of stainless steel farther.

For one, we're continuing our many-million-dollar program of expanding production. For others, we offer every assistance to fabricators to make more efficient use of stainless steel, and to find alternate grades which will use less of the critical alloying materials. *Let us work with you!*

* * * * *

Complete technical and fabricating data—engineering help, too—are yours for the asking from Allegheny Ludlum, the nation's leading producer of stainless steel in all forms. Branch Offices are located in principal cities, coast to coast, and Warehouse Stocks of Allegheny Stainless Steel are carried by all Joseph T. Ryerson & Son, Inc. plants. ● *Address* Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Penna.

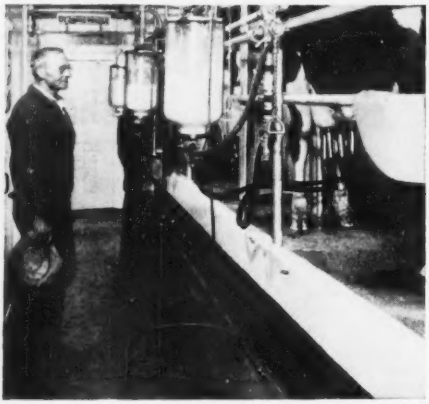
W&D 3774

You can make it **BETTER** with

Allegheny Metal

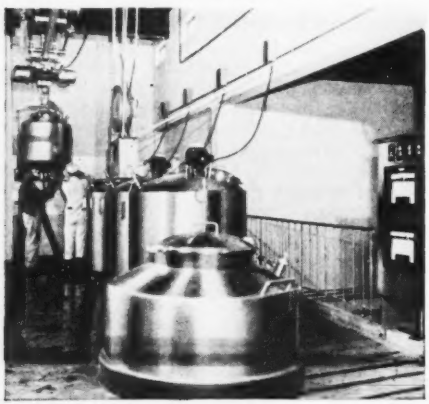
AL
TIME-TESTED STAINLESS STEEL

MIDWEST RESEARCHER PERFECTS NEW TECHNIQUE



MILK *goes directly from cows to weigh jars, enabling farmer to keep performance records. Milk then goes to "farm tank" via pipes . . . under vacuum, and without cooling.*

AFTER MILKING, *tank is sealed to prevent admission of air . . . and is picked up by truck for quick delivery to plant.*



HOISTED *on monorail, the farm tank is weighed and then connected to plant's processing tanks. Honeywell Control Panel is at right.*

2000 GALLONS *of milk are being canned daily by Med-O-Milk Dairy. Plans call for expansion of production to 1000 gallons per hour. All shipments to date have been to overseas locations.*

CONTROL PANEL *automatically shows milk level . . . controls and records temperature in each tank.*

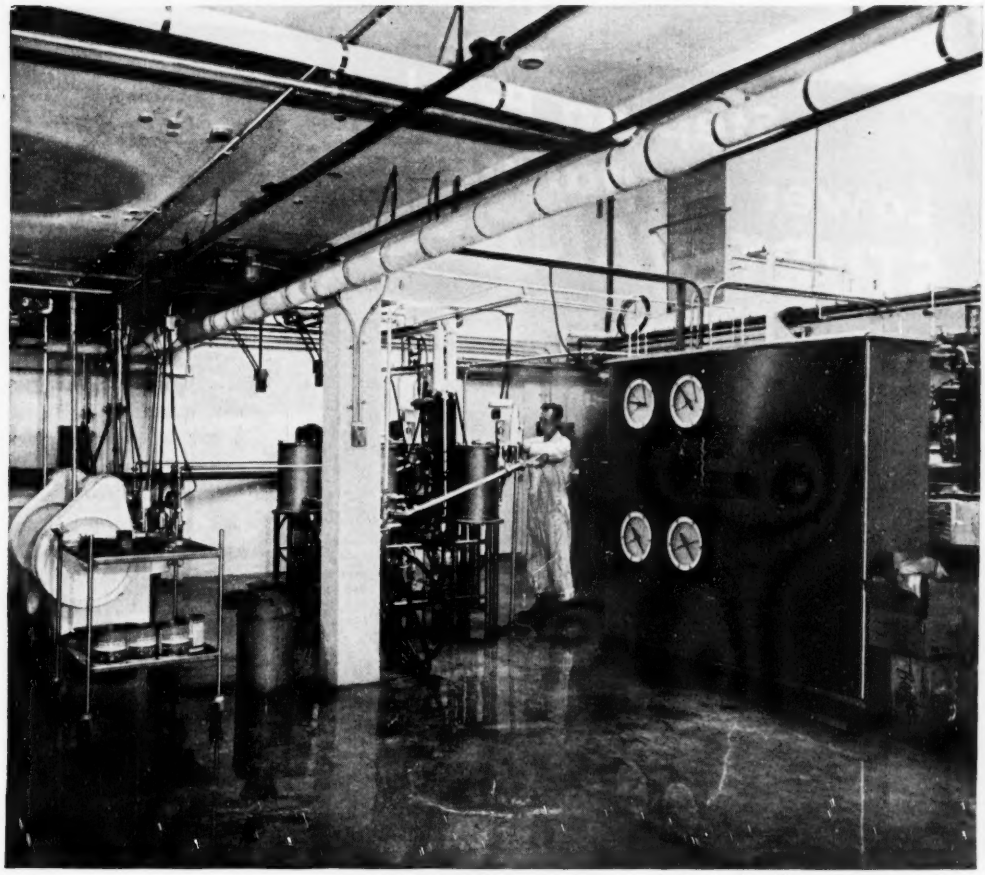
CANNING

New process, using Honeywell Control

Now, fresh whole milk can be shipped anywhere in the world without fear of spoilage . . . as a result of a revolutionary process developed by Dr. Roy R. Graves of International Milk Processors, Inc.

At no time, in the process, is the milk exposed to the air . . . from the cow to the can! Replacing conventional pasteurization with sterilization, the process destroys not only the pathogenic organisms but also other organisms and enzymes which cause spoilage.

Partner for the process is a unique Honeywell



MILK *goes from preheating tank to this room . . . where it is homogenized, sterilized and canned. At no time has the milk been in contact with the air.*

FRESH WHOLE MILK

System, keeps whole milk fresh for 6 to 12 months without refrigeration

Control System that automatically regulates preheaters, heaters, homogenizers, sterilizers and canning equipment. All vital temperatures are recorded . . . all variables rigidly controlled. Honeywell's undivided responsibility in providing *complete* control, with centralized supervision, has helped make this new process a successful one.

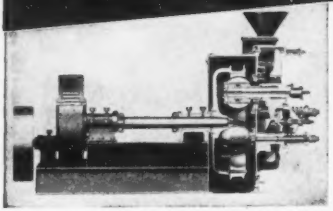
For any complex food processing operation . . . wherever there is a need for creative instrumentation with undivided responsibility . . . you can rely on Honeywell to fulfill the requirements. And whatever *your* requirements . . . whether usual or unusual . . . consult Honeywell first.

Send for literature or call in our local engineering representative, who is as near as your phone.

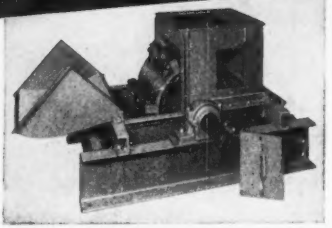
MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
Brown Instruments

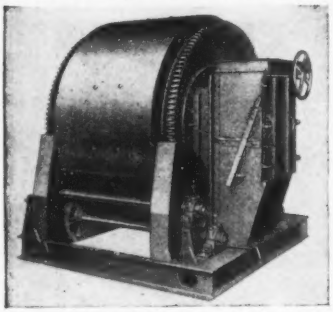
Step-up Production Lower Preparation Costs with STURTEVANT EQUIPMENT



RING ROLL MILL — for medium and fine reduction of hard or soft materials (10 to 200 mesh). Open-door accessibility for easy cleaning. Available in many sizes and capacities.

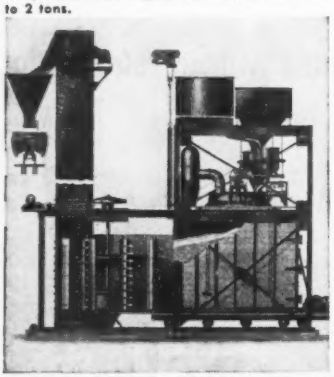


TAILINGS ROTARY PULVERIZER — increases output of fertilizer tailings . . . will not clog . . . leaves no daily accumulation of unground pellets. Capacities up to 25 tons per hour.

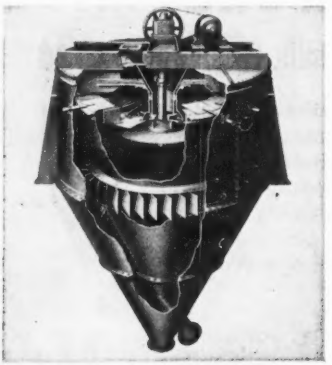


DRY BATCH MIXERS — 4-way mixing action mixes two or more ingredients into an inseparable, homogeneous mass. Open door accessibility makes cleaning easy. Capacities ¼ ton to 2 tons.

MOTO-VIBRO SCREENS — screen everything screenable. Open and closed models with or without feeders. Many types and sizes . . . screens from ½" to 60 mesh.



DEN AND EXCAVATOR — speeds processing of superphosphates. Easily operated by two men . . . produces 16 to 40 tons per batch and up to 480 tons per day of superior fertilizer free from lumps.



AIR SEPARATOR — for finest separation of materials. Capacities from ¼ ton to 50 tons per hour in fineness of 40 to 325 mesh and finer. Increases production of fines, cuts power consumption costs.

Sturtevant Processing Equipment . . . Grinders, mixers, separators, screens, etc. . . . can help you *reduce* today's high manufacturing costs by increasing both machine and operator output, lowering production costs, assuring high quality products.

Records in all types of industries — chemical, plastics, ceramics, cement, food, construction — prove that this equipment works dependably day in, day out with little, if any, maintenance.

Used individually or linked together in proper sequence, they do the job faster and easier than other types . . . handle a larger variety of work.

It will pay you to investigate Sturtevant Processing Equipment for your plant. There is a size and type of machine that will meet your requirements. Write for information.

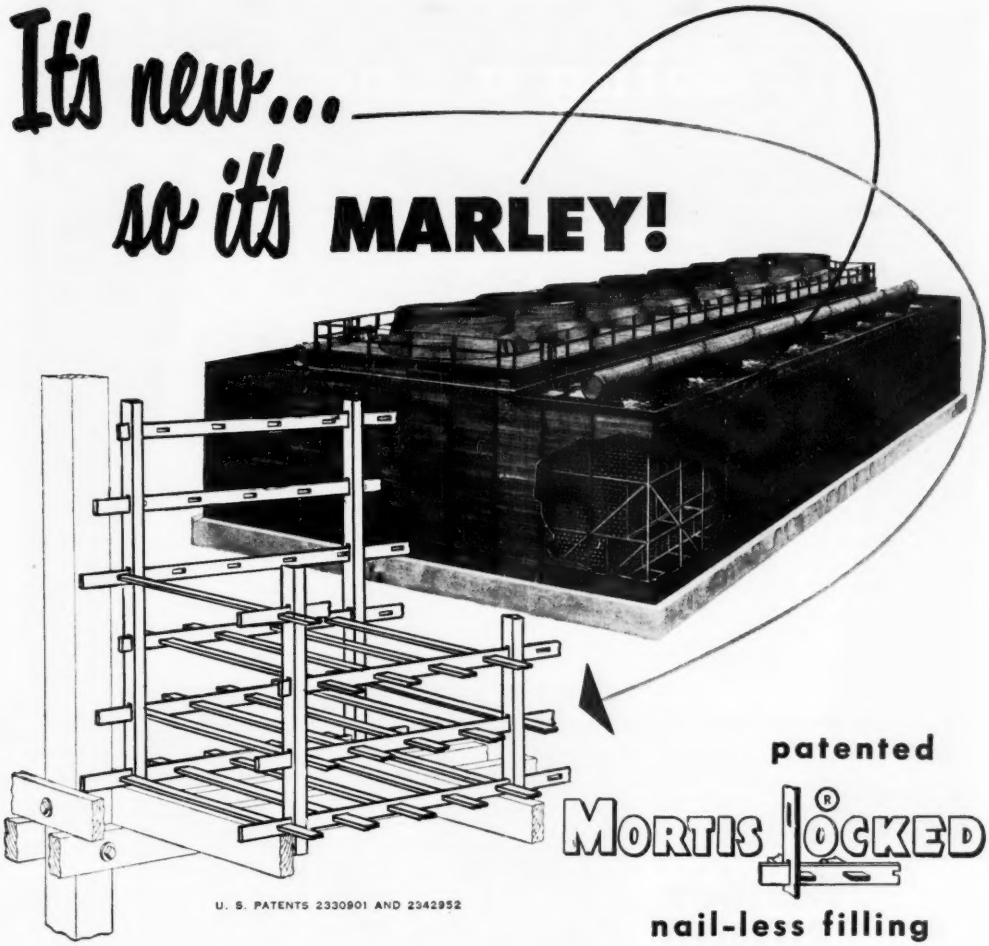
STURTEVANT MILL COMPANY

106 CLAYTON STREET
BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of:

CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS
and EXCAVATORS • ELEVATORS
MIXERS

It's new... so it's MARLEY!



U. S. PATENTS 2330901 AND 2342952

patented

MORTISLOCKED®

nail-less filling

. . . THE COOLING TOWER FILLING THAT BREATHES

. . . has long been an important factor in making Marley Double-Flow the world's leading water cooling tower. Now it's redesigned for even greater ruggedness, more long-lasting stability.

And it retains its ability to expand and contract with every variation of temperature and moisture.

Design simplicity is the keynote of MortisLocked filling . . . no nails, bolts or spacer blocks are needed. There are no parts to rust, corrode or fall out. Bulletin ML-51 graphically portrays MortisLocked superiority . . . write for it now.

producers of
- DOUBLE FLOW TOWERS
- DRICOOLERS
- AQUATOWERS
- NATURAL DRAFT TOWERS
- CONVENTIONAL TOWERS
- SPRAY NOZZLES
- VAIRFLO TOWERS

MARLEY

The Marley Company, Inc.

KANSAS CITY 15, KANSAS

..."doing a fine job"

STANCO SALT

PLANT ON U. S. HWY. 40
W. OF GRANTSVILLE, UTAH

STANSBURY SALT COMPANY, INC.
408 ZION'S SAVINGS BANK BLDG.—PHONE 9-0034
SALT LAKE CITY 1, UTAH

June 16, 1951

Standard Steel Corporation
5001 Boyle Ave.
Los Angeles 58, Calif.

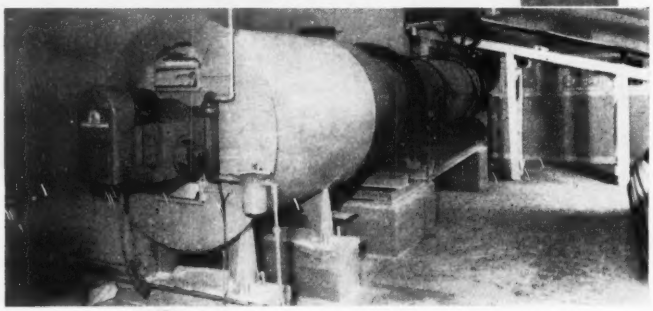
Gentlemen:

The 3-1/2 ton per hour capacity Monel salt dryer, which your company fabricated for us last year, is operating at full capacity in a very satisfactory manner. The thermal efficiency is high and our cost of operation including fuel and electricity is low.

We are pleased with the equipment and it is doing a fine job.

Yours truly,
STANSBURY SALT CO., INC.
A. Z. Richards Jr.

AZR/dw



Another STANDARD HERSEY PROFIT-MAKING *Dryer* INSTALLATION

From operators throughout the country come letters such as the one above—convincing confirmation that Standard-Hersey Dryers are really "doing the job".

The Stansbury Salt Company installation is a routine example of the satisfaction owners may expect from Standard-Hersey equipment. At Standard, an unequaled fund of dryer experience dating back to 1880 is combined with the most advanced engineering and fabricating technique to assure you top value for your dryer dollar.

More than 30 types of Standard-Hersey dryers are available in all commercial sizes for every process industry need.

STANDARD HERSEY *Dryers*

SEND FOR NEW 12 PAGE DRYER BULLETIN

Complete illustrated brochure describes advantages and features of Standard-Hersey Dryers, Kilns, Coolers and Calciners; tells operation of Standard-Hersey "pilot" dryer for pre-testing your product. *Write for Bulletin No. 508.*

STANDARD STEEL CORPORATION

5045 Boyle Ave., Los Angeles 58 ★ 123-45 Newbury St., Boston 16

how to make 1 milligram of

Pfizer Ascorbic Acid

do the work of ... 2

Now you can effect important savings on the antioxidant protection you give your frozen fruit and fish packs . . . for inexpensive Citric Acid can be used to double the antioxidant efficiency of Ascorbic Acid.

For example, it has been found that the usual ascorbic level can be reduced from 200 mg. per pound of frozen fruit to about 100 mg., if citric acid is added to the ascorbic. Pfizer Ascorbic-Citric Mixture 8-92 (8% ascorbic and 92% citric acids), when added at ⅓% on the basis of the weight of fruit, gives ample protection against browning and flavor deterioration. Tests have clearly shown that this and similar mixtures cut the cost of treatment by stabilizing the ascorbic acid, thereby permitting the use of much smaller quantities.

Through years of experience with clients who need to preserve the flavor and appearance of frozen fruits, fish and other frozen packs, Pfizer has acquired a wealth of practical, technical information on the use of Ascorbic and Citric Acids as antioxidants. If you have an antioxidant problem, why not drop us a line today?

PFIZER QUALITY ® PFIZER

ASCORBIC ACID and ascorbic-citric mixtures

For the Frozen Food Industry — Ascorbic Acid, Ascorbic-Citric Mixtures • For the Dairy Industry — Vitamin A Acetate and Palmitate, Sodium Citrate, and Ascorbic Acid For the Milling Industry — Bi-Cap® Enrichment Concentrates • For the Baking Industry — Enrichment Wafers, Gluconic and Fumaric Acid • For the Feed Industry — Bi-Con® Terramycin and Vitamin B_{12} Supplements, Iodides.

Chas. Pfizer & Co., Inc., 630 Flushing Avenue, Brooklyn 6, N. Y.; 425 North Michigan Avenue, Chicago 11, Ill.; 605 Third Street, San Francisco 7, Calif.

Simple Drive or Complex Transmission

WHITNEY
CHAIN DRIVES
Provide Positive Power—Long Life!

Whitney Chain Drives provide innumerable opportunities to save time and money by simplifying drive design.

If your power transmission problems involve long or short centers, reversal of direction, timing motions, fractional or hundreds of horsepower, the unusual adaptability of Whitney Chain Drives will help you meet your design requirements efficiently and economically.

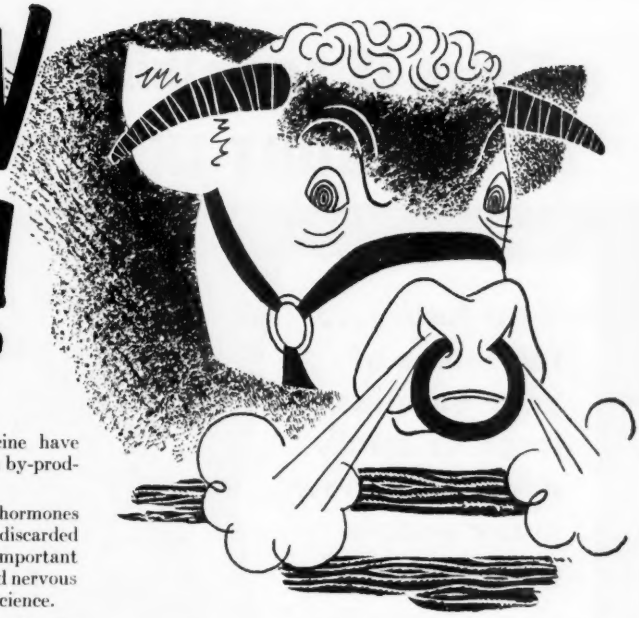
Besides meeting your designs, Whitney Chain Drives help to make a good product better. Their positive grip assures efficient power transmission . . . means that you get *full rated Horsepower* from driver to driven elements. They reduce costly down time — are easy to install, easy to remove without disconnecting shafts or bearings. Their rugged construction of hardened alloy steel parts assures long service with minimum maintenance . . . a vital point in these days of all-out production.

From the complete line of Roller, Silent and Conveyor Chain Drives, Whitney engineers can recommend, without bias, the proper type of drive for each application . . . the chain drive which will give you the best service at lowest cost.

Consult your local Whitney Field Office or Distributor, or write direct to us for complete information and catalog.

WHITNEY CHAIN COMPANY HAMILTON STREET, HARTFORD 226, CONNECTICUT

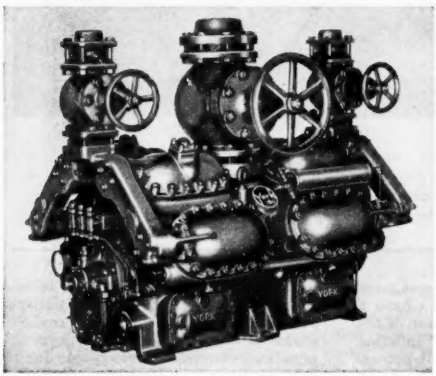
A NEW ALLY!



Important new developments in medicine have turned packing house scraps into valuable by-products and a new source of profits.

In war and in peace, serums, biologicals and hormones—extracted from animal glands formerly discarded as waste—now play an increasingly important role in surgery, the treatment of mental and nervous disorders and other branches of medical science.

Medical research has only scratched the surface in the application of animal gland extracts to human ailments. All indications point to the continued and rapid growth of this still-young industry.



York V/W Ammonia Compressor. Smooth, quiet, vibration-free performance. Equally adaptable to booster or high-stage operation. Available in 4, 6, 8, 12, 16 cylinders.

One of the tools that have made its growth possible is the York V/W Ammonia Compressor . . . used to chill the glands before trimming . . . to freeze them solid after trimming.

There are good sound reasons why the York V/W Ammonia Compressor is at work here as in other branches of the food processing industry wherever cooling is needed—why this efficient, husky compressor is worth your serious consideration:

The York V/W Ammonia Compressor can't wear out! All parts subject to wear are easily replaceable.

You save space! The York V/W Ammonia Compressor requires less floor area . . . less headroom. And York's static and dynamic balance permits upper floor mounting without special foundations.

Unlike machines with fixed capacity, York's power consumption varies in almost direct proportion to product load . . . with power savings up to 72% at 25% load.

Economy- and efficiency-minded managements prefer the York V/W Ammonia Compressor wherever refrigeration is necessary . . . in packing meats . . . concentrating fruit juices . . . baking crackers . . . storing apples . . . in half a hundred industries.

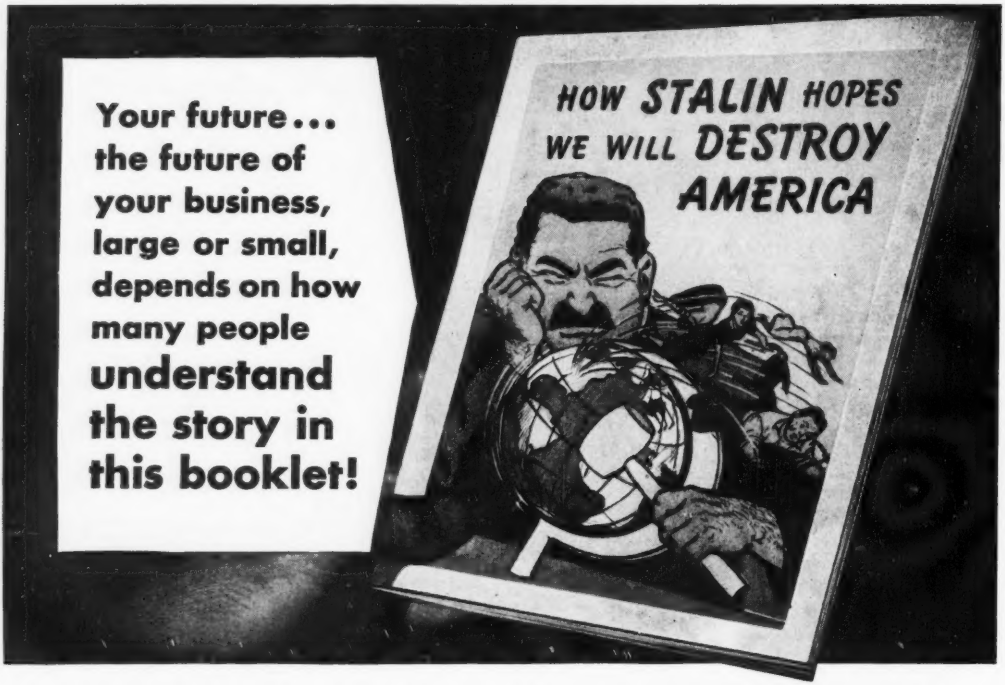
York equipment may be the ideal solution to your cooling problems. See your York Representative (listed in the Classified Directory) or write York Corporation, York, Pa.

York refrigeration air conditioning

The big advances come from YORK

Headquarters for— **Refrigeration and Air Conditioning**

There IS something YOU can do ABOUT INFLATION!


Your future... the future of your business, large or small, depends on how many people understand the story in this booklet!
HOW STALIN HOPES WE WILL DESTROY AMERICA

Businessmen recognize ***inflation*** *as the nation's greatest single threat. But most of us have felt "What can one man—even one business—do to stop it?"*
But there is a way—if enough of us work at it. We can help more people . . . the men and women who work and vote and pay taxes . . . to understand the nature of inflation, its ***causes*** *and* ***cures****. Then we will have gone a long way toward eliminating this pending catastrophe.*

ONE TOOL YOU CAN USE: To help us give our own Bemis workers the inflation picture, we used the colorful, new 16-page booklet "How Stalin Hopes We Will Destroy America" produced by Pictorial Media, Inc. The more widely the booklet is used, the more good it will do . . . and it is available for distribution to your workers, too. It follows the time-proven "comic book" technique . . . dramatizes the dangers . . . and shows how all our citizens can help halt inflation before it's too late.

TESTS SHOW IT HELPS WORKERS: To get an impartial judgment of the value of "How Stalin Hopes We Will Destroy America," it was tested in Bemis plants by the Psychological Corporation under the direction of Dr. Henry C. Link, a foremost research authority. Dr. Link says "Those workers exposed to the booklet were found to have a significantly higher appreciation of the recommended ways to stop inflation than did the workers who did not see the booklet. Details of this test are available upon request." And Bemis factory workers make such statements as "Everything it says hit home, but you'd never figure it out for yourself until you read it"...."It's told in an interesting way so anyone can understand. My daughter, age ten, understood all of it"..."In picture form it impresses you more. Most people don't read about it"..."Had ideas that we wouldn't think about otherwise while we are working away—good book, agree with it—I guess I won't be the only one."

Because we believe this message is growing more urgent every day, Bemis is taking this means to commend to other businesses this weapon against inflation. It is the first of a series of such material that we expect to use.

BEMIS BRO. BAG CO.
St. Louis 2, Missouri

FOR EVERY BUSINESS, LARGE OR SMALL: In quantities, it costs only a few cents a copy—$10.00 for 100 copies, down to 3 cents per copy in larger quantities. Single copy free. For full information, write PICTORIAL MEDIA, INC., Attention: Paul Wheeler, 205 E. 42nd ST., NEW YORK 17, N.Y.

Here are 7 *big reasons why*

Dowfume EB-15

is "Tops" for food machinery and spot fumigation

1. **Highly effective against all common pests of food processing establishments.**
2. **Low volatility.**
3. **Nonflammable.**
4. **Has a warning odor as a safety factor.**
5. **Economical.**
6. **Time-saving—easy to apply without special equipment.**
7. **Residual effect delays reinfestation of stock.**

There are *many* reasons why Dowfume EB-15 is indispensable to all-around effectiveness in food plant sanitation. Seven are given here—and, with use, you will discover other worthwhile advantages of this outstanding fumigant material.

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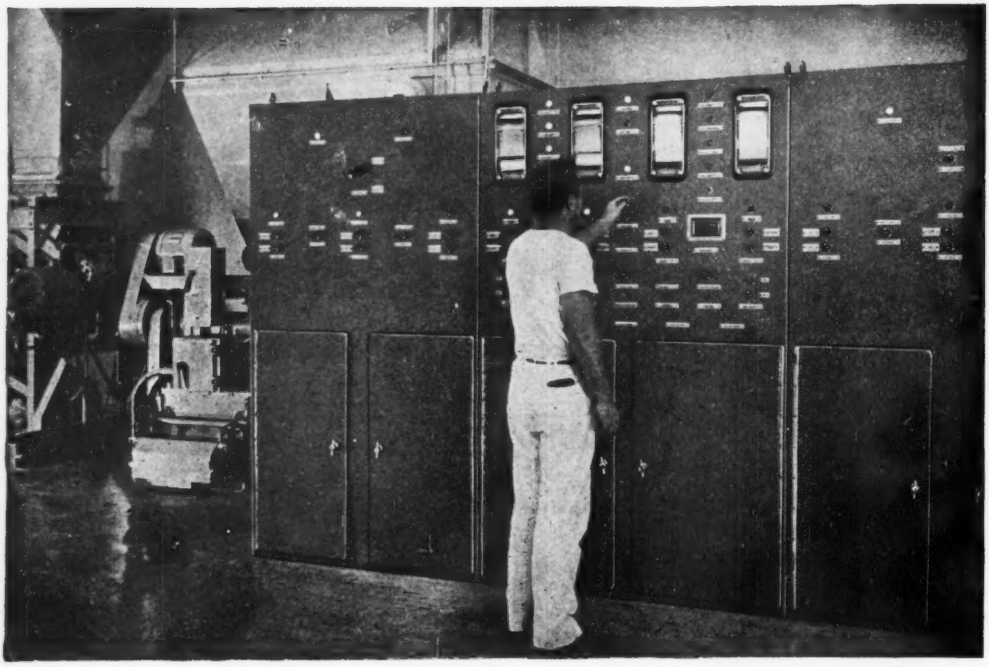

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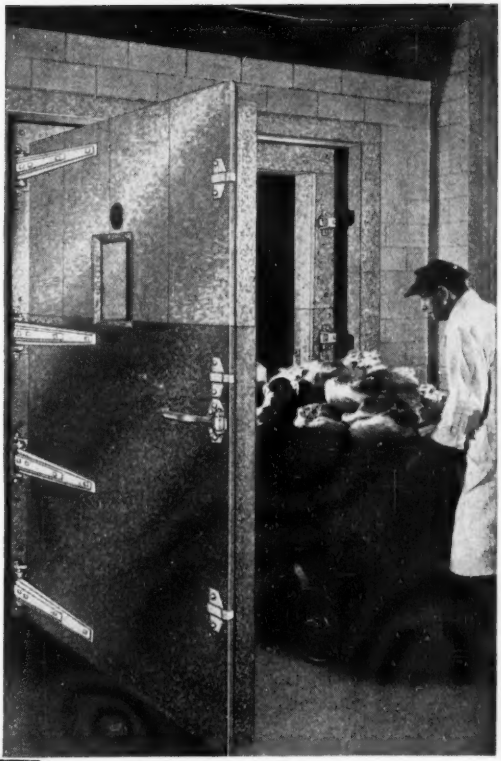

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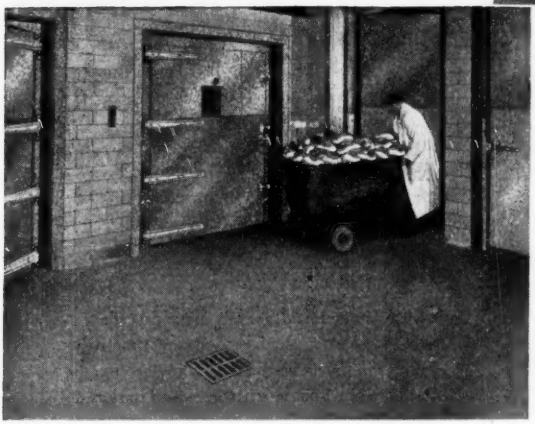

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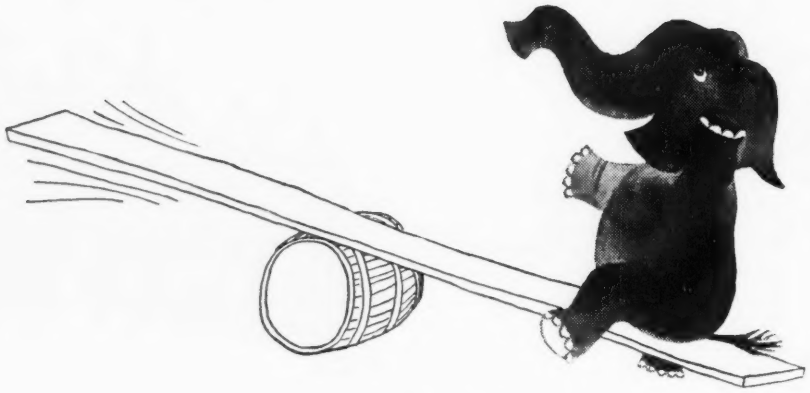

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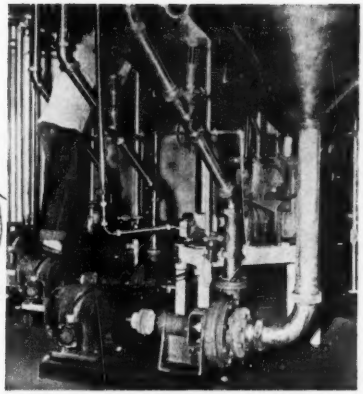

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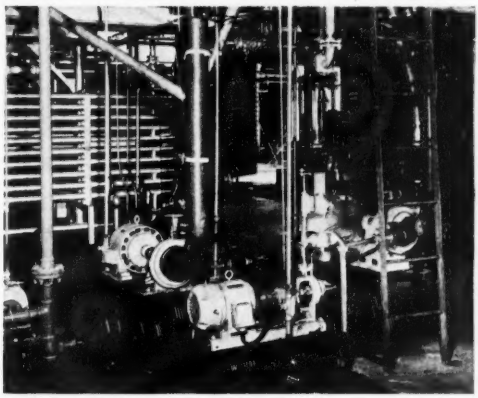

MINUTE MAID CORP. (Plymouth, Fla.) installation uses Worthington Worthite Pumps (mechanical-seal type) on this Buflovak Evaporator. Large pumps in rear circulate the orange juice, small pump discharges concentrate through Rotameter from 29.5" Hg vacuum to holding tank under atmospheric pressure.

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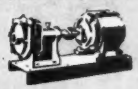

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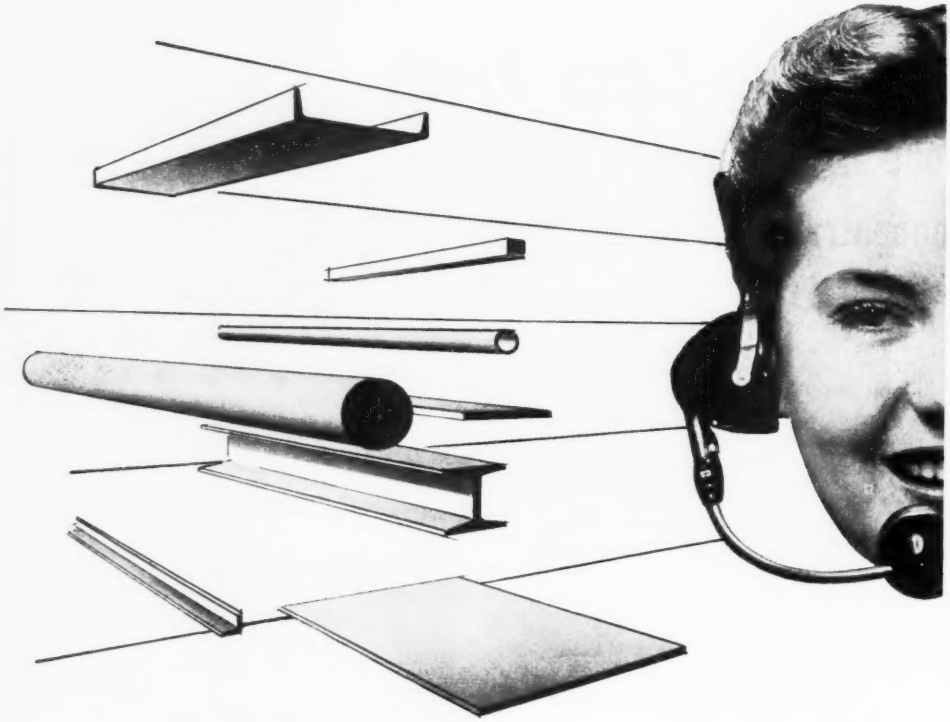

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Safeguard Your Raw Materials *And You Safeguard Profits*

Every pest bred by insanitary storage attacks the same place—your pocketbook. Defense is to "tighten" storage; "sell" employees on prevention; slate—and stick to—checkups; and discard old lots

J. CARL DAWSON and RAY MILLARD
J. Carl Dawson & Associates, St. Louis

Are your raw-material storage areas *really* getting the sanitary attention they need? Stop and consider truthfully—for improper warehousing can cut deeply into your profit margins, as well as make your operation vulnerable to contamination.

Specifically, sanitation can be the key in maintaining efficient, streamlined flow of materials through the storage area. And in the rest of the plant, too.

Quite a number of types of storage are encountered in food processing plants, but a full discussion of all of them would exceed our present range. Since the majority of raw materials are received in bags, drums, and cartons, storage of this type will be primarily considered.

How Not to Do It

A glance at some *improper* raw material storage practices will demonstrate some of the problems:

Recently, the writers were in a small carton-storage area of a food plant. The room was extremely disorderly—boxes were cluttered about, the shelves being empty while the floor area was full. There were three or four open boxes of the same size carton, some new cartons had been dropped on the floor and trampled under foot, and it was evident rodents were on hand.

Employees had to hunt for the specific cartons they sought, and they didn't leave any records of what they finally took. Here, poor housekeeping and inefficient, wasteful storage combined to cut profits.

To steer clear of such conditions, you should intensively examine these three major means of control:

- **Employee education—selling the plant personnel on the benefits to be derived from the application of sanitary principles in the warehouse (as well as in the processing section).**
- **Proper physical warehouse facilities and rodent control—including preventive maintenance.**
- **Alert food-material handling and storage practices.**

Since any food material once contaminated cannot be salvaged and reused, the problem must be approached from a preventive point of view. All personnel should realize the importance of keeping the plant as clean, wholesome, and free of contamination as anything produced in their own kitchen. Proper sanitation stems from these employees rather than from any magic materials or equipment. Therefore, your first step must be that of selling your own plant people on the benefits of good housekeeping.

Check Them On These Points

In connection with unloading the car or truck, do they bring in extremely dirty packages without first cleaning them off? Do they walk on bags, thus leaving dirt on them which can go through to the contents, later to enter your product—with more dirt falling in from the outside of the bag while it's being emptied?

Do your warehouse people bring in contaminated or broken packages? Is the use of tobacco as well regulated in the warehouse area as it is in the production area? Do the warehouse employees tend to keep their areas clean as they go about their regular work? When there is spillage, is it cleaned up immediately? Are materials stacked and stored so that they are easily moved for cleaning?

These are only a few of many questions that should be asked. The success of your sanitation efforts in your storage area—and throughout your plant, for that matter—will depend more upon your ability to educate your employees on good sanitation, so that they practice it because they genuinely believe it is the right thing to do.

Tips On Preventive Tactics

Let's look at a food company that has applied the necessary principles in storage practices. Perhaps the president of this company was stimulated by F & DA prosecution of a fellow processor on a contamination count. Or perhaps he read an article similar to this. But whatever the reasons, a glance at his well-organized raw material storage area will prove of great value.

Tight-fitting, self-closing doors separate storage, completely, from the plant. And it is to be noted that there is no processing operation of any kind in the storage area. The floor is free of cracks where dirt may accumulate and bacteria develop. The point where the floor meets the wall is calked shut, eliminating cracks usually associated with quarter-round. Or the wall meets the floor in a curve, so that there is no sharp corner to collect dirt.

The warehouse is free of partitions wherever possible, and especially those that have hollow spaces in them. There is no false ceiling or floor where dirt may collect and serve as food for undesirable life.

On the floor of this model warehouse, next to the wall, there is an 18 in. wide strip of traffic white or yellow paint. Materials have been carefully kept back from the wall, off this line, so that it is possible for a man to walk completely around materials in storage. Next to the wall are a number of rodent traps, kept in operation all the time, even though a rodent has not been caught for months.

Guard Never Lowered

There is no place in the storage area where a rodent can get out of sight—which forces it to exist in the open, a condition not normally to its liking. At least once per week, a responsible exterminator or assigned plant group makes a complete circle of the white line next to the wall, looking for signs of rodents. Traps are checked and rearranged whenever necessary.

Inspection from the outside indicates the building is as rodent-proof as possible. All outside doors are self-closing and tight fitting, and the receiving dock is so constructed that neither rats nor mice can reach the warehouse floor. There are no inviting steps for rodents to climb, but rather a steel ladder for the employees.

If it is one of the more modern structures, the building may have a vestibule-type entrance that permits unloading through the large receiving door, which may then be closed and the materials moved on into the storage area through self-closing doors. During the summer months, surfaces around the receiving dock are sprayed with one of the more recently developed residual sprays—a practice of considerable value in preventing house flies and other insects from entering.

Vacuum, Not Broom

The materials themselves are kept clean, as well as the floor under and around the skids or pallets, by the use of a high-powered vacuum cleaner. In this manner, dust and dirt are removed rather than pushed around as is the case with brooms or brushes. It is noted that all storage is at least 10 to 12 in. off the floor.

Walking down the clear, well-marked aisle, various lots of prominently-tagged materials may be seen. The tags give all essential information concerning the material, including the date received, code number, and other pertinent data. It is an unbroken rule that the oldest material is used first, with quality control men double-checking to see that materials do not become over-aged before they go into production.

Food Storage Only

The area is specifically designated for food storage. Hence, there is nothing here but raw food materials—no old machinery, wrapping paper, cardboard cartons, or such.

There are no cabinets in the storage area. Flavors, spices, and the like, are kept on wire shelving, and the floor under the shelving not used.

A fumigation chamber is adjacent to the receiving dock. By serving the dual purpose of minimizing cold-storage and insuring against infestation, this chamber can contribute sizable savings. Many plants not using the fumigation technic are forced to minimize infestation by keeping raw materials in cold-storage—usually at very high rates.

Modern fumigants can penetrate multi-wall paper bags and boxes of dry food commodities, thereby killing all stages of insect life, including the egg. Normally, after fumigation is complete, the materials are moved into warm storage, where they are protected from re-infestation, first by the cleanliness of the storage, and second by the use of modern, residual sprays properly applied to all floors, pallets, and skids. If remaining in storage beyond a designated period of time, the materials are re-fumigated and returned to storage.

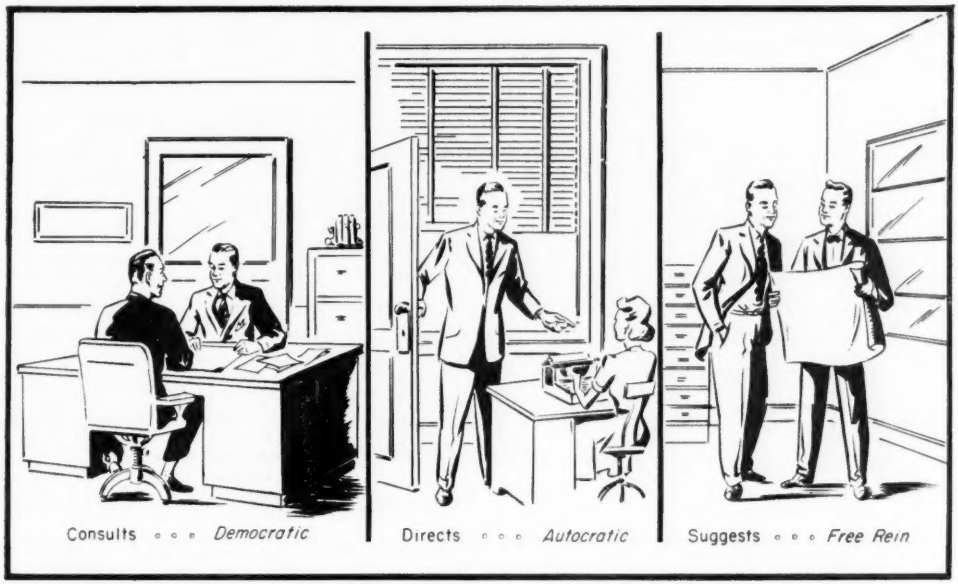
Old Stuff Gets Heave-Ho

Warehouse inventory records provide spaces for sanitary inspection. In this connection, all materials that have been in the warehouse for more than two weeks are given a special inspection* for any signs of insect development, or other contamination. Any odd lot that is beginning to show contamination can be eliminated from the warehouse. **Discontinued raw materials are not permitted to remain**—they are disposed of as quickly as possible.

(*Turn to page* 161)

*Also see Author Dawson's article, "*Proper* Raw-material Inspections," p. 91, May FE.

"The Successful Leader Generally Does All Three"



LEADERSHIP: A New Slant

Is it something a man is born with? A matter of personal qualities? Or perhaps family upbringing? . . . Author Uris has a different—more practical—answer that promises you notable benefits in the plant

AUREN URIS
Editor, Research Institute of America, Inc.,
New York City

The productivity and job satisfaction of your subordinates stem directly from the quality of the leadership provided.

To every man in management, that statement holds out promise of improved results in his job. Yet, most concepts of leadership run those hopes right up a dead end. For example:

"Leaders are born". According to this idea, your genes determine whether you do or don't make the grade. Ability to lead, in other words, is a definite inherited charactertistic, like eye color. Fortunately, there are enough examples of "made" leaders—Lincoln, and others—to put this approach in its proper place.

"It's a combination of personal qualities". This theory propounds that a leader must possess certain qualities —such as imagination, initiative, determination, and the like. The idea might carry some weight, except for an unfortunate circumstance: Exponents of this approach can seldom agree as to the qualities required.

"It involves family psychiatric aspects". Still another approach offers the impression that successful leaders tend to have a family background of a particular pattern—a good relationship to the male parent, for example. And here again we find that the man seriously interested in improving his own leadership skills is put back in the licked-before-he-starts category.

• If, however, we are going to offer a peg on which a man can hang a program of self-improvement, then leadership must be considered a skill or technic—like golf or piano playing.

And the fact is that recent investigations, both by experimental psychologists and practical experts in the management field, have gradually been developing just such an approach.

These studies make it clear that leadership is not a single kind of activity. On the contrary, there are three basic types of leadership: The democratic, the autocratic, and the free rein (sometimes termed *laissez-faire*). Generally, the labels have this meaning:

• Democratic leadership. The leader draws ideas and suggestions from the group by means of discussion and consultation. Individuals are encouraged to contribute toward setting of policy. The agreement of individuals with group decisions is sought. The democratic leader's role is largely one of moderator.

• Autocratic leadership. Here, the leader assumes full responsibility for all action, and mainly seeks obedience from the group in following his directives. He determines policy, considering decision-making as solely his activity and responsibility.

• Free rein or laissez-faire leadership. The free-rein leader is more or less an information booth. His role in the group's activities is kept at a minimum. Essentially, he's on hand to

implement the activities of the individuals in the group. He provides materials, information, and only a minimum of control.

Last Stone In the Road

Once these three leadership methods are clear, one further idea puts you on the road to self-appraisal and improvement in your leadership ability.

The idea itself is so simple as to be obvious. Yet, the fact remains that it has not only been overlooked, but very often its opposite has been stated as true. This point is that the three methods of leadership—democratic, autocratic, and free-rein—are not three alternative methods from which you must choose one. On the contrary, the successful leader generally uses all three. And to a large extent, the basic problem for the leader is to know which conditions call for one approach rather than the other two.

This fact has often been obscured, both in practice and in discussions about leadership, because of a general tendency to the view that one type—democratic leadership—is superior to the other two methods.

GAGE *YOUR OWN* LEADERSHIP

Here is a quick test by which you may rate yourself—(1) on understanding of leadership technics, (2) on adapting the method to the people, and (3) on adapting the method to the situation.

For best results, first run through the accompanying article to get a clear idea of the three types of leadership. The rest is simple: Just read the questions carefully and mark one square for each.

Answers are given at the end of the test (they're printed upside down to mask them). And instructions for scoring then follows.

	Democratic	Autocratic	Free Rein
Understanding of Leadership Technic			
1. If you were supervising the activities of a group of highly-skilled individuals, which leadership method would be most likely to yield the best results?	☐	☐	☐
2. Mr. Jones has an assistant who frequently gets lost in a maze of details when working on an assignment. What leadership method has Mr. Jones apparently been using inappropriately and unsuccessfully?	☐	☐	☐
3. If you felt it would be worthwhile to tap the information and ideas of your subordinates by conferences, which leadership method would you use to conduct such conferences?	☐	☐	☐
4. You have all the "know-how" in a particular line of activity. Essentially, what you want from your subordinates is obedience in following your directions. Which leadership approach would you use?	☐	☐	☐
5. Which leadership approach is best suited to build a cooperative spirit among your people?	☐	☐	☐
Adapting the Method to the People			
6. Which method would you use in dealing with timid individuals?	☐	☐	☐
7. One of your subordinates is capable and self-reliant. Under which leadership method would he be most likely to function best?	☐	☐	☐
8. One of your people seems capable enough, but he tries to flout your authority at every opportunity. Which approach would you have to fall back on to keep him in line?	☐	☐	☐
9. Which method is best suited to the personality of a good "team player"?	☐	☐	☐
10. For a person with little self-reliance, which leadership approach would be most likely to prove best?	☐	☐	☐
Adapting the Method to the Situation			
11. You're up against a problem to which you don't know the answer. Which approach would you use with your subordinates in order to get their ideas?	☐	☐	☐
12. In a critical situation, when time is of the essence, which approach would waste least time in side efforts?	☐	☐	☐
13. One day you overhear one of your subordinates ask another, "Has 'Simon Legree' got back from lunch?" They're referring to you. Which leadership method would you have been using?	☐	☐	☐
14. With reference to the above situation, to which method would you consider switching?	☐	☐	☐
15. If you were put in charge of a group of technical people, each working on a more or less separate assignment, which leadership method would be the logical one to employ?	☐	☐	☐

Answers

1. Free rein, 2. Free rein, 3. Democratic, 4. Autocratic, 5. Democratic, 6. Autocratic, 7. Free rein, 8. Autocratic, 9. Democratic, 10. Autocratic, 11. Democratic, 12. Autocratic, 13. Autocratic, 14. Democratic, 15. Free rein.

Scoring

While it's obvious that this limited quiz can't give you a precise measure of leadership performance, it will, however, serve as a check. You may compare your scores according to the three aspects named. In a rough way, your strong points and weak points will be spotlighted, respectively, by a high or low score.

Give yourself 10 points for each correct answer. Then use the table below for an approximate rating of your total leadership score.

120–150	Outstanding
80–110	Good
50– 80	Poor

Note: A low score doesn't necessarily mean ineffective leadership. It's more likely to indicate an insufficient understanding of the methods and technics of leadership available to you.

While there is no doubt as to the importance of democratic leadership, the fact remains that, *under certain conditions,* one of the other two methods of leadership will prove to be effective and successful where democratic leadership will fail.

Selecting the Proper Approach

Contrary to the beliefs of many, these three leadership approaches are not mutually exclusive. No one has to choose between being, say, a democratic or an autocratic leader. That would be tantamount to telling a golf player he would have to choose between using a driver and a putter. During a game, he'll use both.

It may be noted that Mr. X, a highly effective executive—

Consults with his legal adviser on a matter of law about which he must arrive at a decision.

Directs his secretary to have his lunch sent up.

Suggests a line of action to an assistant, putting him on his own as to the precise means of following through.

In the ordinary sense of the word, each of the three individuals with whom he has thus transacted business are subordinates. But the difference in his approach to each is clear. He consults (democratic method) with one; directs (autocratic) a second; and suggests (free rein) a course of action to a third, giving him volition as to the means to be used for carrying out the job.

Road to Success

The successful leader is not, in effect, a democratic leader, or an autocratic leader, or a free rein leader. Rather, he is the man who understands the factors that make one or the other of these approaches the proper choice in a given situation.

These major guides should help you decide which approach to use:

1. Makeup Of the Group. The chief factor in determining the method the leader generally uses are the types of individuals in the group. Here, for example, are three typical kinds of groups found in management organizations today, each linked to the leadership approach which will, in the majority of cases, produce the most satisfactory results:

Democratic leadership. A works manager has five divisional heads reporting to him. Each of the five are old-time line men who have learned their jobs from the ground up. Each is capable of taking sound, independent action. In areas where responsibilities overlap, they work well together, without friction.

Autocratic leadership. Here, the

(*Turn to page* 201)

ADVANTAGES of new method were demonstrated when findings of organoleptic taste panel (above) were converted into pictorial form. Here, members of panel discuss aroma and taste of vanilla pound cakes used to check system.

SHARPER FLAVOR RATINGS

With Improved Profile Test

Overall appeal and threshold levels of food flavoring agents now differentiated by pictorial technic . . . Consistency proved in evaluation of vanilla pound cakes

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New strides have now been made in organoleptic-panel flavor evaluation of food products through development of a more comprehensive flavor-profile approach.

■ **Unlike the former pictorial method, the new technic now distinguishes threshold level (flavor detection) from overall quality or appeal.**

This distinct advance has been accomplished by employing two semi-circles—instead of one—for the graphic-area (quantitative) representation of the flavor evaluations.

Tests of vanilla pound cakes gave proof of the new values. Here, three different vanilla-flavoring agents were evaluated by the new system, and the results demonstrated consistencies between findings of panel-members.

First, a few words for background. Because of the lack of correlation between instrumental methods and human response, the food industry is still saddled, so to speak, with the ancient taster. However, modern tasting procedures have been improved to such an extent that, if standard procedures are followed, both reproducible and reliable results can be obtained.

Particularly notable here is the new approach to flavor problems through the organoleptic flavor-profile technic. Developed by Cairncross and Sjostrom of Arthur D. Little, Inc., this method follows the same general procedures that apply to all organoleptic-panel testing, except that the terms of the

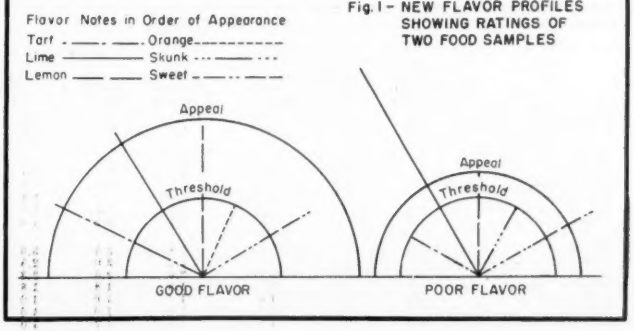


Fig. 1 – NEW FLAVOR PROFILES SHOWING RATINGS OF TWO FOOD SAMPLES

evaluation are such that the final results may be readily converted to pictorial form.

The profile method presents a descriptive analysis of flavor, that expresses in common-language terms the characteristic notes of both aroma and flavor, their order of appearance, their individual intensities, and the overall aroma-and-flavor quality.

It is possible by this flavor-profile technic to illustrate with diagrams (rather than only by numerical values) the aroma and flavor of various food products. And differences between food samples are thus readily apparent to the layman as well as to the trained flavor expert.

Although comparison of vanilla-flavoring materials is sometimes made by smelling the materials themselves, or by smelling and tasting them in dilute water solution, in sweetened milk, or in ice cream mixes, the final and most dependable comparative evaluation must be made in the actual food product containing the flavor. Moreover, the comparison must be made under conditions simulating production, storage, and consumption.

Take, for example, one of the volume-production items in the baked-goods field—plain pound cake. This cake depends primarily upon vanilla for its characteristic flavor, hence was selected for our tests. It is true that here the flavor depends to a considerable extent upon eggs, shortening, and other ingredients (some bakers also add mace, nutmeg, and other supplementary flavoring agents). However, it is the added vanilla flavor that gives the cake its distinctive flavor notes.

Steps In the Testing

Three different vanilla flavoring agents were evaluated. One was a good-quality pure vanilla extract, chosen by panel evaluation as the best of three commercial products. The second was a laboratory-prepared standard vanillin-coumarin blend, equivalent to standard strength pure vanilla extract. The third was a carefully blended vanilla-type flavoring having a Mexican vanilla bean base and formulated by one of the well-known flavoring houses.

This preliminary evaluation was necessary because there is no official standard for the actual flavor quality of pure vanilla extracts.

For the baking tests, we followed a standard commercial formulation and method for making the cakes so that our results would be directly comparable with those obtained by bakers. The three vanilla flavorings were used at equivalent strength levels in their respective cake mixes, the level selected representing commercial practice.

One of the most important factors in obtaining reliable results in organoleptic evaluation is the use of a trained panel of experts. In order properly to evaluate vanilla flavor in pound cake, our panel members were chosen for their ability to evaluate both vanilla and pound cake. After selection, they were put through a training period in which the various aroma and flavor notes detectable in pound cake were discussed and the various components of the flavor profile were established.

For instance, the question of the salt note arose during the training sessions. Some panel members claimed that salt could not be detected. In order to educate all panel members as to the type of flavor contributed by salt to sweet goods, a cake without salt was baked. This cake had a bland flavor, and the absence of salt was readily detected.

This test convinced the panel members that salt does not always taste like the salty flavor associated with such foods as meat or vegetables, and particularly that its flavor at the threshold level in sweet goods is qualitatively quite different from that associated with an excess of salt.

Three lots of pound cake, differing only in the type of vanilla flavoring used, were then baked concurrently under carefully controlled conditions. These cakes were code-marked and submitted, 24 and 72 hr. after baking, to a five-member flavor-profile panel for aroma and flavor evaluation. They were checked first for aroma and flavor appeal (the overall aroma and flavor quality). Samples were then re-coded and the various aroma and flavor notes evaluated. This prevented any influence of the appeal rating on the strength rating of the notes.

After the individual ratings were recorded by each panel member, a discussion was held and the final ratings were established by consensus. Three replicates of this baking and scoring procedure were conducted. Then an average of all results was taken and the final flavor profiles established for the cakes containing each type of vanilla flavoring.

Revised Flavor Profile Method

The original ADL (Arthur D. Little) flavor profile, as described in several papers and bulletins, consists of a large semicircle, the area of which represents the total flavor or aroma amplitude. Threshold is indicated by the perimeter of the semicircle, and individual notes are designated by lines that originate at the center. Some lines may reach just to the perimeter, indicating notes barely at recognition level. The distances to which the other lines extend beyond the perimeter of the semicircle indicate the relative intensities of the notes they represent.[9, 10, 11]

But certain inconsistencies are inherent in this scheme. The size of the semicircle represents total overall aroma or flavor amplitude and quality, as well as threshold level of the individual notes. And since there is no way to determine the relationship of threshold level to amplitude or overall quality, we set up a modification of the ADL-flavor profile in which threshold level and overall quality or appeal are represented as two independent factors.

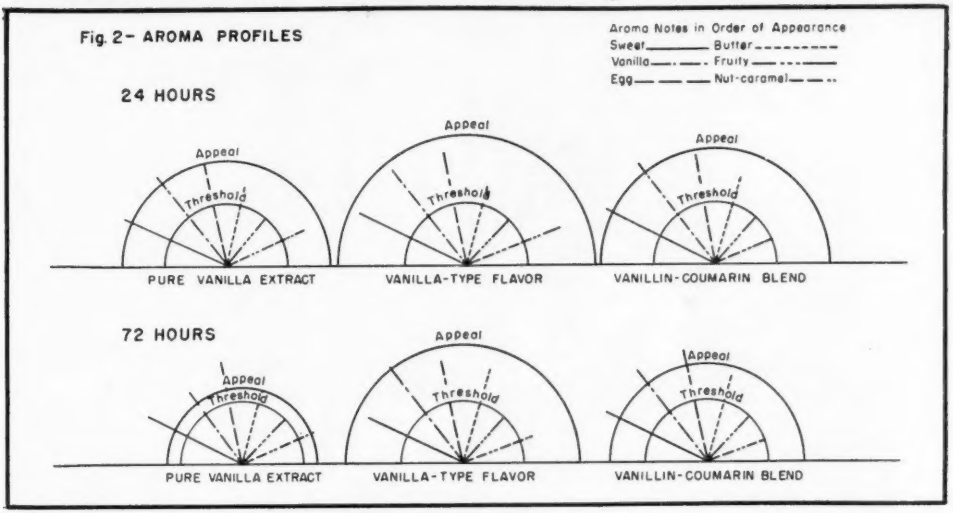
In our system, the flavor or aroma appeal (overall quality) is represented by the perimeter of one semicircle. The perimeter of an inner concentric semicircle represents threshold level of note strength. Lines that originate at the center of these semicircles represent individual notes. Those notes that reach only to the perimeter of the inner semicircle are just detectable. The distances the lines extend beyond the perimeter of the threshold semicircle indicate the relative strengths of the notes they represent.

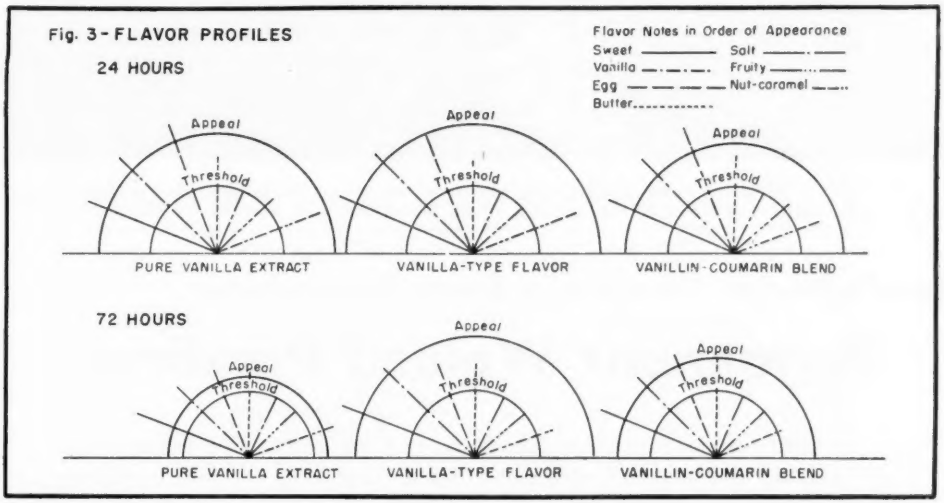
In a series of samples, one with the lowest flavor or aroma appeal is arbitrarily given a rating of unity for appeal. This appeal semicircle is just slightly larger than the threshold semicircle. The appeals of all preferred samples in a series are larger, and the sizes of their appeal semicircles are quantitatively related to that of the sample rated as unity.

FINAL COMPOSITE Aroma and Flavor Profiles of Pound Cakes

	24 Hr. After Baking			72 Hr. After Baking		
	Pure Vanilla Extract	Blended Vanilla Type	Vanillin-Coumarin Blend	Pure Vanilla Extract	Blended Vanilla Type	Vanillin-Coumarin Blend
Aroma appeal	1.9	2.9	2.3	1.0	2.5	1.8
Flavor appeal	2.3	2.6	2.0	1.0	2.3	1.6
Aroma						
Sweet	2.7	3.0	3.0	2.5	2.5	2.8
Vanilla	2.7	3.0	3.2	2.0	3.0	2.8
Egg	2.8	2.8	2.8	2.2	2.5	2.8
Butter	1.3	1.3	1.8	1.5	1.8	1.8
Fruity	1.0	1.0	1.0	1.0	1.0	1.0
Nut-caramel	1.7	1.5	1.0	1.5	1.5	1.0
Flavor						
Sweet	3.3	3.5	3.2	2.8	3.5	3.0
Vanilla	3.2	3.3	3.0	2.2	3.0	2.5
Egg	3.2	2.9	2.8	2.0	2.0	2.3
Butter	1.8	1.8	1.8	1.8	1.8	1.8
Salt	1.0	1.0	1.0	1.0	1.0	1.0
Fruity	1.3	1.0	1.3	1.0	1.0	1.0
Nut-caramel	2.0	2.0	1.5	1.5	1.5	1.0

"PRECISION BY SEMICIRCLES": Pictorial Gage of Vanilla Pound Cakes





Size of the threshold semicircle for all diagrams is the same and represents the threshold of perception for all notes in the particular food tested by the panel. It is true that the ingredient concentration that will just produce a threshold level of flavor is not always the same for each flavor note. Also, it is not always the same for each product. However, in order to avoid any misconception that there is a correlation between overall quality and threshold level, the threshold semicircle was set at a constant size—slightly smaller than the appeal semicircle representing unit appeal.

Flavor notes bear a relationship to this threshold level. All notes that are just detectable extend to the perimeter of the threshold semicircle. Those that are stronger extend beyond the threshold semicircle. And length of the lines extending beyond the threshold semicircle bears a straight-line relationship to the strength ratings of the notes given by the panel members.

Fig. 1 shows new-method flavor profiles of two samples of a food product —one of very good flavor and one of very poor flavor. Poor flavor may be caused by foreign flavor notes, or by those that are too strong and result in poor flavor balance. Some notes which should be subdued may be too strong, or some may be missing.

It will be noted that the sample with poor flavor appeal has no orange note and that a skunk note has been detected. The line and sweet notes are too strong, and the tart note is not strong enough. Thus, we have a very poor flavor in this sample. But the sample with good flavor appeal has a very large appeal semicircle, and the skunk note is not present. This sample has good flavor balance.

In the present study, the pound cakes were first evaluated for aroma and flavor appeal, the poorest cake being rated unity. The highest rating possible was arbitrarily set at 4.0, corresponding to the ultimate in flavor

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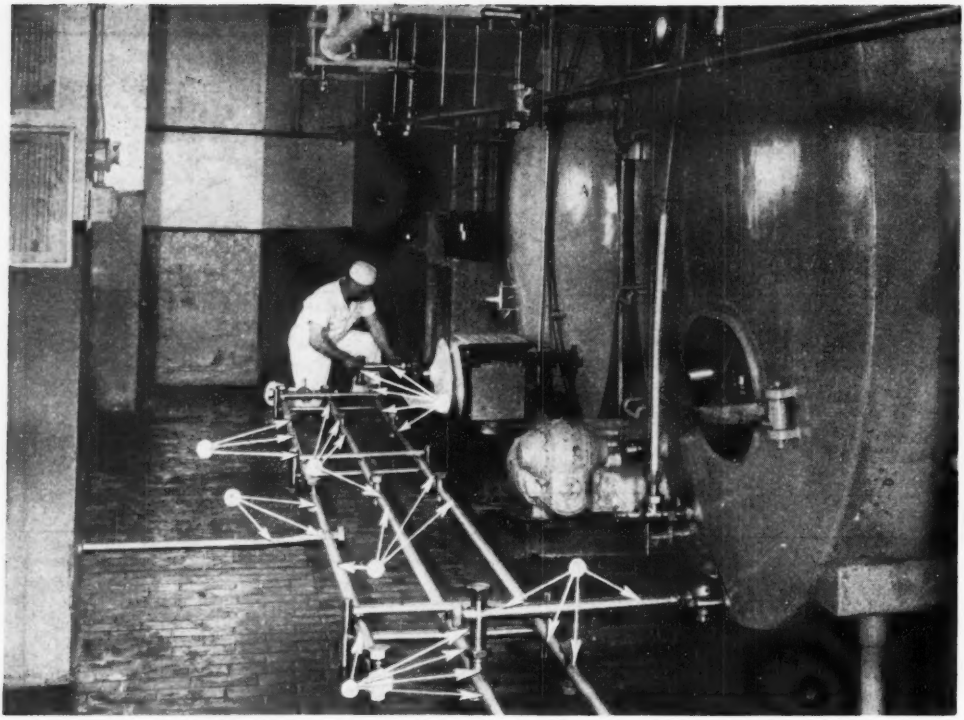


WELDED CONSTRUCTION (28 welds are indicated by arrows) and substitution of crosses for pipe bends in this tank-to-filler hook-up assure efficient cleaning and sanitizing without labor-consuming dismantling and assembling.

Revolutionary Advance in Dairy Engineering:

Permanent Welded Pipelines

They cut plant cleanup costs more than 25 percent, reduce bacterial contamination, product losses, and plant maintenance . . . Special welding technics are outlined

C. R. HAVIGHORST
Associate Editor, "Food Engineering"

The success of a permanent, welded sanitary pipeline can now be measured in terms familiar to the dairy plant operator.

For its high degree of sanitation, its economies and efficiencies have been demonstrated by the permanent lines now in operation in the several plants of Lucerne Milk Co., Oakland, Calif., pioneer of this revolutionary engineering advance.

■ **The company's records, substantiated by those of the Oakland Department of Public Health, explode the common theory that all dairy pipelines must be dismantled for sanitary reasons. Moreover, they show that the permanent system provides fewer sources of bacterial contamination. And consequently, products processed through these lines are of a uniform high quality.**

The installations offer evidence that, when the same metal is used for welding as that of the pipe, a weld is the most satisfactory and practical joint. And sanitation is assured by a new means of grinding and polishing the inside portion of the weld.

Outstanding advantages of a permanent line, as compared to the conventional type, are:

I. *Greater Sanitation* because many cracks and crevices which provide hiding places for bacteria are eliminated.

II. *Costs are cut* as follows: (1) Plant cleanup labor is reduced at least 25 percent, (2) maintenance and repair work is cut to a minimum, (3) sanitizing and cleaning solutions are re-used after they have been brought up to strength, and (4) there are eliminated the costly shutdowns caused by leaks in lines due to mechanical damage or improperly installed gaskets.

In a conventional, demountable type line, pipe lengths are connected by sanitary unions soldered or expanded on the ends of each length. When installed in a line, it is often necessary to insert a paper gasket in each union to prevent leaking. Outlets, valves, tee's and bends also are normally soldered to the pipe or connected to the line with sanitary unions. These soldered, or expanded connections, have many faults, all of which affect the sanitation and durability of a line.

Common solder (tin and lead) is a poor material for forming joints because of its low tensile strength compared to stainless steel. It is easily cracked by vibration or stresses. Voids are common, and these, in time, fill with milk solids. Both silver and common solder have thermal expansion coefficients different from stainless steel, and this factor tends to cause physical breakdown of these materials.

All types of metal overlaps have proven unsatisfactory because a perfect and permanent filling for the interspace cannot be made with dissimilar metallic alloys (solders), Temperature changes loosen most fittings or connections of this type, particularly if made of stainless steel. This is due to the warping action of this metal when subject to temperature variations.

Recessed fittings, when soldered, will not remain tight. Voids in the soldering material will occur and cracks will develop in time. Expanded fittings (recessless) that do not use solder to connect them in the line, leave an open seam at their rear edges. Even if this seam is soldered, it still tends to leave voids, under the fittings, which may easily fill with milk solids.

Nevertheless, the dairy industry has been using lines fabricated by this means because there was no better method available.

In addition to the foregoing problems, the repeated daily handling of pipe lengths, to remove, clean, sanitize and reassemble, has always been a source of mechanical damage. Broken connections, battered fittings and bent or badly damaged lengths of piping are common occurrences. Often, a close examination of lines in seeming perfect condition will uncover a number of recesses or voids at points where joints are made. Frequently these voids are not seen unless the fittings are removed completely from the piping. Such conditions made necessary a continual and expensive replacement and repair program.

Why Not Weld Lines?

Spurred by mounting labor and equipment costs and, also, a conviction that the conventional type of pipeline was not the most efficient milk handling method, work was begun to find a satisfactory method of fabricating a permanent line.

First step was predicated on the knowledge that welding of stainless steel containers and tanks had become routine. It was only reasonable to assume, therefore, that sanitary pipelines could also be permanently joined in this manner.

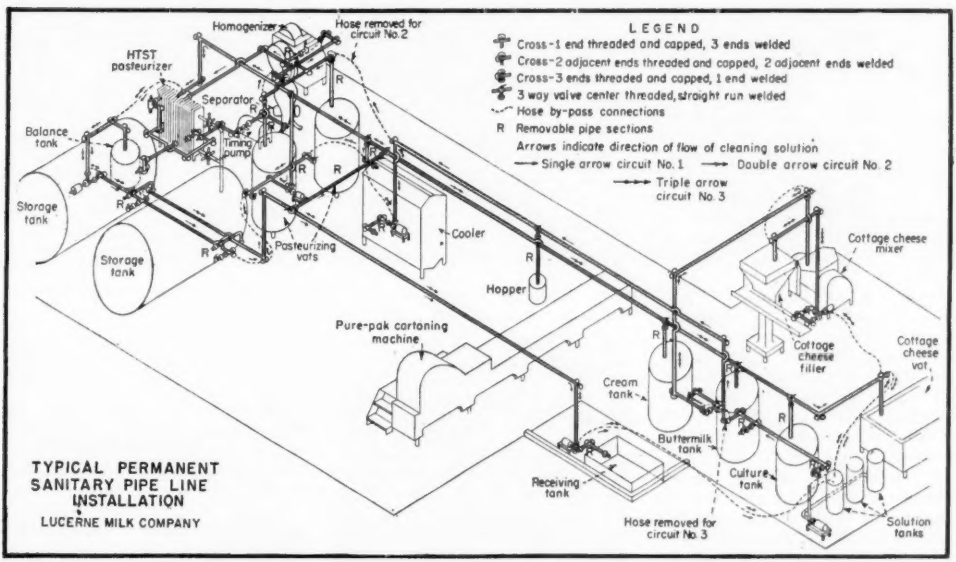
It required three years of experimental work to perfect a safe, satisfactory method for fabrication and to develop a technic of welding and of grinding welds. Suppliers of fittings were called upon to fabricate "extended" fittings which could more easily be adapted to the welded line.

It was the grinding of welds, inside sanitary piping, that posed the greatest problem. Oxy-acetylene welding was relatively easy. But, at the outset, even after the welding technic had been perfected, it was found that a serious void and a significant structural weakness occurred following grinding.

These original welds were made on pipe lengths just as they came from the fabricators, or when the pipe was cut to length with a hacksaw and sawguide. The weld was made by placing the two pieces of pipe about $\frac{3}{32}$ in. apart in a jig. First there was tack-welding at eight points around the joint, then the weld was completed.

But, in making this outside weld,

This is Welded-Line Layout for Conventional Dairy



PERMANENT STAINLESS STEEL SYSTEM (heavy lines) for 4,000-gal. milk plant requires about 300 welds. Extra piping for recirculation of cleaning and sterilizing compounds is permanently attached (temporary hose connections may also be used). "Jumpers" circumvent positive pumps. One high-pressure pump maintains necessary velocity of cleaning solution to give adequate turbulence in all parts of piping system. Equipment is joined to main pipe lines by short, removable sections that are detached during cleaning. Pitch of lines is ¼ in. per 25 ft.

TO MAKE THE WELDS: These are tools and materials . . .

FIG. 1—KIT includes pipe cutter, welding jig, flux, oxy-acetylene torch and gas, 1/16-in. stainless steel welding rods, pipe, valves and fittings. Latter should have extended connections to facilitate welding.

FIG. 2—GRINDING HEAD has three sticks of aluminum oxide abrasive pressed into channels in each leaf. Worn sticks are easily replaced.

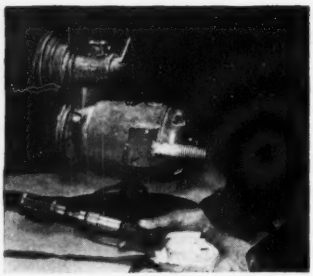


FIG. 3—TOOL is ready for work when 1⅝ in. flexible shaft is attached to grinding head. Unit has remote switch.

the welding metal did not penetrate uniformly to the full thicknes of the sanitary pipe. Instead, it left a small but unsanitary void, or crack, completely around the inside of the weld where the two pipe ends were joined. While it was possible to remove this void by grinding, the severity of this operation so weakened the pipe that it became hazardous to use. And the time required for grinding was so great as to make such a method uneconomical.

Hacksawing so many pieces of pipe for experimental work had become too laborious by this time. So, to speed the work, a pipe cutter was substituted. And by fortunate coincidence, this method of cutting pipe actually shaped the ends so they could be welded and ground perfectly smooth without sacrificing the strength of the pipe.

The vise-like but uniform pressure applied by the cutting wheel and its opposite roller, as the pipecutter is revolved around the pipe, has the effect of reducing the diameter of the pipe-end inward, forming a perfect but smaller circumference. The reduction in diameter begins about ¾ in. from the end of the severed pipe and is approximately ⅛ in. And most important, a beveled edge is imparted, to the periphery of the concentric pipe end. This is equivalent to increasing the gage of the metal, thus giving more surface on which to weld.

Now, when two pipes, the ends of which have been cut with a pipecutter, are put in the jig, the welding metal can be placed farther into the "V" formed by the two beveled edges. This "V" acts as a guide for the molten welding material and prevents burning through the tubing. The void normally remaining in such a weld is deep within this "V" and requires little grinding to eliminate.

Joints Strong as New

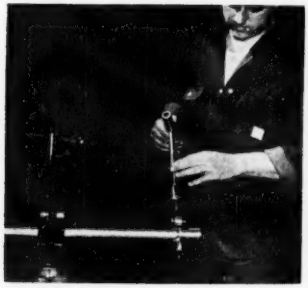
Tensile strength of the pipe after grinding remains normal, if not stronger. This is because there is more metal remaining at the point of the weld due to the bead formed by the welding metal, which entirely covers the two bevels. At least ⅛ in. of metal may be removed from the inner circumference of the pipe by grinding and polishing without affecting its strength. And the bead may be completely ground off when the outside of the pipe is polished (see photo).

Adequate evidence that this permanent pipeline system is superior, from a sanitary standpoint, to the conventional type is demonstrated by standard plate counts taken from line rinses and products. In computing contamination by rinse counts, it was found that a more suitable comparison could be made by adopting the Standard Methods for the Examination of Dairy Products*, but expressing results in terms of colonies per 1,000 ml. capacity. This is satisfactory when estimates of rinse water indicate less than 1,000 colonies per 1,000 ml. of capacity, instead of "less than 1 colony per ml. capacity". The change in method is used because of the exceptionally slight degree of contamination encountered.

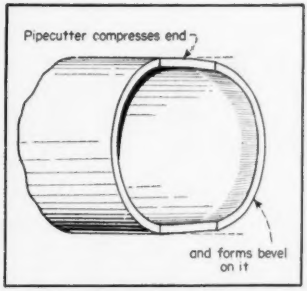
Laboratory counts taken daily for over two months, showed a maximum contamination of 284 colonies per 1,000 ml. capacity, and an average contamination of 36 colonies. Further checks on contamination are represented by the results obtained by the Oakland Health Department, which in this same period took 18 samples.

**Standard Methods for the Examination of Dairy Products*, Ninth Edition, p. 51, Section 1.58, states: "Large, well cleaned dairy equipment is considered satisfactory when estimates of rinse waters indicate less *than 1 colony* per ml. of capacity."*

. . . and here's how to do the job



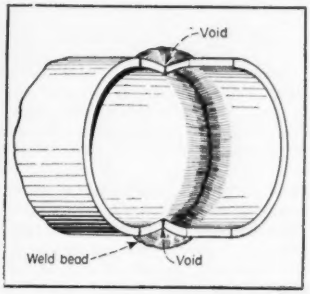
Use pipe cutter . . .



. . . to form ends this way

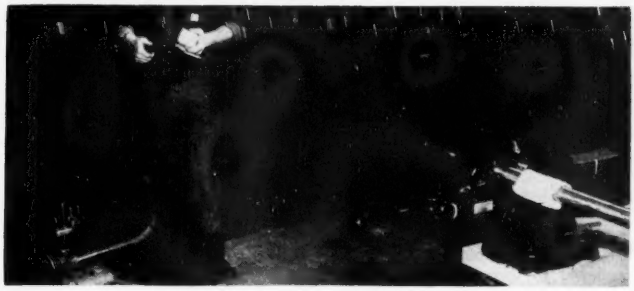
Then tack pipes together

Weld them carefully and you will have . . .

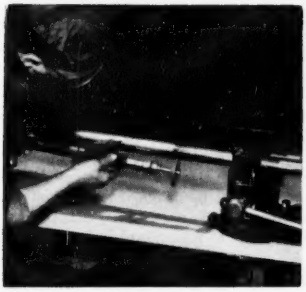


. . . a joint like this

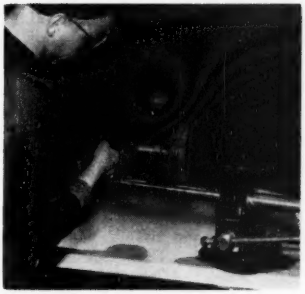
Now push grinder in pipe



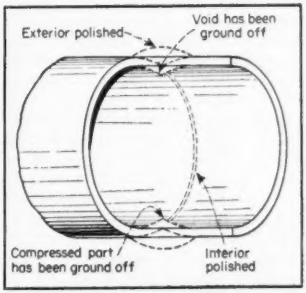
And grind until sections are flush



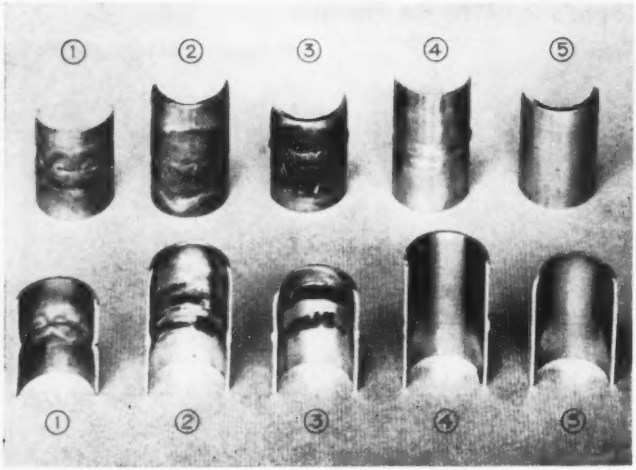
Next coarse-grind the bead



Polish



And you have finished weld



HOW WELD APPEARS at each step in the fabrication of a stainless steel pipeline (joining of two 10-ft. sections). (1) Tack-welded at 8 points; (2) weld completed; (3) inside-ground for 40 sec.; and (4) finished joint. At (5) is seen section of stock pipe (note how top edge has been beveled by pipe cutter).

These results included return circulating lines and showed a maximum contamination of 616 colonies per 1,000 ml. capacity and an average of 31 colonies. Duplicates of all samples taken by the Health Department were checked in the plant laboratory and results showed an average contamination of 27 colonies.

To further confirm the sanitary features of the lines, there were routine "standard plate counts" for the last 3 weeks of checking (Table I). These counts cover the entire operations of processing with full use of the welded lines. Finished products were taken at hourly intervals during each day's run. Raw samples represent the source for all finished products.

Clean-up men have accepted the new line and do a satisfactory sanitizing job. The new method of cleaning was explained to them only once. After this, they worked from written instructions.

Design and Installation

At the outset, a careful design and plan must be made of a proposed permanent line. Unlike a conventional line, once installed it is difficult and expensive to revise.

Consideration must be given to the various kinds of products to be run through the line, and the sequence in which they are to be run. In some cases this may require a rearrangement of schedules for processing certain products. By judicious use of three-way valves it is often possible to route products through the main line in either direction from equipment. A sufficient number of inlets and outlets from the main line must be included for all processing and storage units.

It seems neither practical nor feasible to weld equipment and storage connections directly into the permanent line. Instead, short removable pipes should be used, thus making it possible to cut out or to clean equipment while the line is still in use conveying other products.

Lines should be arranged so that they may be easily cleaned by circulating solutions. To facilitate sanitation and cut cost of installation, the system must be designed compactly so as to reduce return lines. It must include additional lines or hose connections, wherever needed, to provide for a means of complete circulation of cleaning solutions through all welded pipes.

Crosses should be used instead of tee's or ells. These give access in either direction, making it possible to grind all welds and, also, to make interior visual inspection of the lines.

Careful calculation of the pitch of the line will assure adequate drainage. The line should be mounted rigidly with hangers or supports, closely spaced to prevent vibration or undue strain on any part of it.

Cleaning and Sanitizing

The new types of inhibited-acid and compounded-alkali cleaners make the cleansing and sanitizing of permanent lines simple and positive. Three storage tanks for the cleaning solution are used at Lucerne. Each tank has a capacity equal to 150 percent of the entire system. And each is connected with a valve to a short welded line or manifold. A removable line and pump connects this to the permanent line when it is being cleaned.

A cleaning and sanitizing method similar to that used for plate and tubular heat exchangers is satisfactory. This consists of the following steps:

1. All removable pipe lines connected to the permanent line are removed, cleaned and sterilized.
2. The permanent line is rinsed with warm water (90 to 100 deg. F.)
3. An inhibited-acid solution at 140 to 150 deg. F. is circulated for 20 to 30 min. Then the line is rinsed with warm water until clear.
4. An alkali cleaning solution at 140 to 150 deg. F. is circulated for 20 to 30 min., followed by a warm water rinse (10 to 20 min.).
5. All caps, nuts and valve plugs are removed, cleaned and sterilized and, when necessary, the permanent lines are given a mechanical brushing.
6. A chemical sterilization agent (chlorine rinse—300 ppm.) is circulated for 10 min.
7. The permanent lines are again subjected to chemical sterilization treatment immediately before use.

Tanks Save Detergents

The cleaning solution tanks offer other efficiencies and economies. In them it is possible to uniformly mix cleaning compounds with definite volumes of water. And they permit the recovery, storage and, after being made-up to strength, re-use of large amounts of these cleaning solutions.

Effective cleaning by the circulation method depends largely upon completely filling the line and the turbulence of the solution through the system. Recommended is one high-pressure pump capable of producing a velocity of 35 gal. per min. in a 1½ in. line at a discharge point.

Regulations of the Oakland Department of Public Health, concerning the sanitizing of permanent lines, state: "Cleaning method is the same as for HTST units, with rinse, acid solution, rinse, alkali solution, rinse and chlorine solution. Velocity of cleaners must be maintained to give sufficient turbulence in all parts. Turbulence cannot be measured by a pressure gage, but better by the discharge in gallons per minute.

"It is estimated that this should be from 25 to 30 gpm. A positive pump carrying 2,000 gph. in a 1½ in pipe should have a booster pump about halfway in the circuit. Return lines should be smooth to avoid excess friction. Pipes must be filled at all times. Pressure must be maintained in larger lines. All equipment should be disconnected when cleaning."

The major cost in constructing a permanent line is the fabrication,

welding and polishing of welds. At present West Coast labor rates, the approximate cost of each weld is $2, including cost of grinding material, so only through the use of the most efficient tools and equipment can this fabrication be done economically.

No lighter piping than 16 gage stainless steel should be used in this type of system. All valves and crosses should be ordered by specifications developed according to their intended specific use. Some of this equipment will have ferrules. On the single item, outlets may have to be of the extended type to facilitate welding into the line (Fig. 1). To simplify ordering, planning and assembling, all fittings are called for with extended ends.

Welding the Pipe

The conventional oxy-acetylene welding equipment is most easy to handle. The faster arc welding may be used. However, here only a skillful operator can obtain uniform results. Heli-arc has since been tried with good results.

With the oxy-acetylene, or gas welding, use 7 to 10 lb. of gas and 5 lb. of oxygen. A No. 1 or No. 0 tip is best for the torch, with the flame adjusted to a slight feather. Use a 1/16 in. stainless steel welding rod. The minimum amount of heat necessary for penetration will give the best results. Any good SS flux has been found satisfactory.

The jig may be easily made from two 4-to-8 in. "C" clamps to which are welded, on both the upper and lower jaws, sections of light angle-iron. The pipe cutter is an ordinary tool used for cutting all types of pipe. It must have the cutting wheel renewed often. A pipe vise will serve to hold the pipe while cutting.

The most important finishing tool is the grinding head. Lucerne developed its own (Fig. 2). This is a cylindrical unit with three leaves that are spring-loaded. It is designed to hold three hones of aluminum oxide abrasive. When in operation, the springs hold the abrasive firmly against the inside of the pipe and will remove just the parts of the flange and bevel which extend into it. In so doing, it also removes the void, left in the welding process.

The power unit used for driving the grinding head is a 3/4-hp. step-pulling-drive Mall Flex Shaft Grinder (Fig. 3). It is necessary to have a flexible shaft to connect the head with this unit. Several lengths of dairy pipe-cleaner flexible shafts have been found satisfactory for this purpose. For a 1½ in. O.D. stainless steel tubing, use a flexible shaft of not more than 1¾ in. dia.

All joints that are to be butt welded are first prepared by cutting the pieces of pipe with the pipe cutter, using a reasonable amount of pressure. As previously mentioned, the cutter compresses the pipe and, also, makes a bevel at the ends. When pipes are butted together in the jig, this "V" holds and acts as a guide for the weld. The pieces are first fluxed on the inside, then placed in the jig, spaced about 1/32 to 1/16 in. apart.

When properly aligned and spaced, the joint is tack-welded in at least eight different places. Tacks should be placed opposite each other and care taken to tack on opposite sides after each initial tack is made. Tacking is important. It eliminates much of the heat distortion usually occurring when a weld is made on thin stainless steel.

After tacking, a uniform bead is applied all around the joint. Sufficient heat should be used for proper penetration of the welding material.

Grinding and Polishing

The inside of each welded joint must be ground and polished. The finishing, grinding and polishing of the outside can be done at a later time. A different size grinding head is needed for each different diameter of pipe.

The best hones are No. 120 grit (35-A, 120, Q-7, BB 2), Resinoid bond, aluminum oxide abrasive. For best results the grinding head should turn at 4,500 rpm. Length of time for grinding the inside of a weld is determined by inspection of joints, where possible, and, also, by removing and inspecting at regular intervals, during assembly, welds that are in the center of long lengths of pipe.

Since there is greater danger of overgrinding than undergrinding, the operator should carefully time the grinding of welds. Sixty to 80 sec. of grinding is sufficient. The hone must be moved alternately—forward, then back—to insure a blending of the welded portion with the stock pipe. The work should be cooled, by folding a wet cloth over the weld or running cold water on it. Cooling prevents discoloration of the work and greatly prolongs the life of the abrasive sticks.

When grinding welds in the centers of long lengths of pipe, you should first measure the distance from the entry end to the weld. A mark on the shaft will indicate when the grinding head is directly within the weld. Then the weld is first coarse-ground.

Six-inch cotton buffing wheels, coated with adhesive, then sprinkled with 120 grit alundum powder, are used to grind and polish the outside of welds. These can be attached to the flexible shaft or to a portable grinder. This wheel will not give a high polish to the surface of the pipe and weld. But it will remove most of the scale and discoloration and leave a velvety appearance to the tubing.

If a high polish is desired, it can be obtained by first lightly grinding the outside of the weld with a No. 30 grit rubber bonded grinding wheel. Follow this with a cloth wheel using No. 120 grit alundum powder, and finish with a soft buffing wheel and polishing compound.

LABORATORY CHECKS Prove That Welded Pipelines Reduce Bacterial Contamination of Pasteurized Products. (Standard Plate Counts—See Text Page 76).

Raw Milk (Colonies)	Pasteurized in Laboratory (Colonies)	Colonies in Finished Products (Listed in sequence as they were run through welded lines)					
		1 cream	2 cream	3 milk	4 milk	5 milk	6 milk
25,000	100	200	100	300	100	300	300
18,000	200						
26,000	200	100	200	600	200	500	300
28,000	100						
13,000	200	*	300	300	400	300	100
11,000	100						
5,600	100	400	100	100	400	600	400
15,000	100						
*		400	800	600	100	400	100
*							
11,000	200	800	*	300	300	400	1100
18,000	100						
5,600	100	1400	200	400	200	100	300
31,000	100						
54,000	100	*	*	100	900	400	500
9,000	100						
12,000	100	500	200	1700	300	200	200
5,900	100						
*		700	300	400	100	300	200
*							
12,000	300	7000	1200	2000	1400	1500	1600
6,300	500						
6,400	100	400	400	200	100	400	400
11,500	100						
21,000	100	1100	1800	300	200	300	400
13,000	*						
20,000	300	*	100	100	900	500	200
16,000	100						
*		1400	200	1000	400	400	600
*							
27,000	100	300	200	200	900	700	800
5,100	100						
16,000	500	500	200	400	2600	600	400
27,000	1500						
12,000	200	1100	1800	500	700	400	100
17,000	100						

* No Sample.

TRIMMED meats are stuffed into double-wall cellophane casing so that product may be quick frozen and sliced.

PREFABRICATED items are quickly frozen in —50 deg. F. air-blast rooms. This gives high quality.

Armour's Prefab Meats

Company develops products, packages, technics and machines to provide housewives—as well as institutions—with convenient, uniform portions

FE STAFF

Back in '46, meat packers began to plan beyond the veil of wartime restrictions. At that time, Armour's President F. W. Specht was asked this question at a grocers' association meeting:

"Are prefabricated and prepackaged meats in the program of the meat packer?"

Mr. Specht's answer was both cautious and encouraging.

He pointed out that prepackaged cured and smoked products were already an actuality. Continued expansion here was easy to predict. But the big question was expansion in the newly developed field of quick frozen prepackaged meats.

"Yes," he said, "we have been carrying on extensive experimental work on quick frozen meats. We have ready and available quite a number of items—some for sales testing, some for actual distribution at the opportune time. And these are completed packages in every respect —with labels, designs, product name."

"But," spokesman Specht cautioned, "that is not the big problem." And he went on to visualize the costly changes that would be required in the average packing house to ready it for a volume prepackaged business. These would involve:

1. Transferring function of retailer to packer, with the latter cutting, trimming, packaging and weighing, as in the retail store.

2. Installing new and specialized equipment for quick freezing, prepackaging, storage and transportation.

3. Adding large numbers of specially trained workers to handle the new prepackaging operations.

4. Increasing the cost of meat preparation—some prepackaged items may up costs 10c. per pound, even after crediting waste utilization.

How far the meat packers would go in effecting these costly changes would depend, Mr. Specht pointed out, upon consumer preference during the forthcoming years.

Let's Look at Today

President Specht's thoughtful analysis of the future of prepackaged meat in 1946 has been borne out in its most optimistic form at Armour today.

In addition to effecting a virtual revolution in technics of packaging and merchandising cured and smoked products —such as luncheon meats, frankfurters and bacon—the company now has a total of 40 fresh frosted items on the market. And seven of these were introduced recently, with great success, in 8-oz. prepackaged portions.

In addition, the company already has found it profitable to put this enterprise on a national basis. Latest count showed prepackaging facilities located in 22 plants.

TEMPERED frozen meat rolls are mechanically sliced into uniform portions for 8-oz. consumer packages. Portions are tiered with waxed paper dividers and then are machine-wrapped at high speed.

Tap New Market

It seems that the all-important enigma of Mr. Specht's talk— the attitude of Madam Consumer—has resolved itself in definite fashion. And consumer preference for this new, convenient form of meat keeps mounting. Small wonder that most meat packers—in pattern similar to Armour—are quietly developing the needed facilities and climbing on the band wagon.

Problems Have Been Licked

Many problems confronted the company in the development of its prepackaged meats program: First, completely unprecedented lines for mass production had to be set up and mechanized. Second, assurance was needed that the products would maintain their quality for a reasonable time after leaving the plant.

A packaging pilot plant was set up after the war to develop new methods of preparing, cutting, packaging and freezing specialty items. Its findings were turned over to the operating division, which adapted existing equipment —such as slicers, dicers, stuffers and cubers—and worked out new machines for the specialty lines.

Perhaps the greatest achievement during this "setting-up" period was the development of the "Flex-Vac" vacuum-packaging concept in co-operation with Standard Cap & Seal Co. (see FI, Dec. 1950, pp. 38-39). This has proved effective in protecting the quality of bacon and sliced luncheon meats.

Packaging cured and smoked meats in heat-sealed, vacuumized, transparent flexible pouches—via the Flex-Vac unit—has eliminated the shelf-life problem. What's more, light discoloration is avoided in this package because damaging oxygen does not contact the meat.

FRESH FROSTED trimmed veal roast is labeled following dip into oleo to provide protective coating.

Another problem, however, was somewhat abstract. It involved eliminating a popular prejudice against frozen meat, which stemmed from past experiences with damaged slow-frozen products. Armour's —50 deg. F. blast freezer rooms were a solution to the problem. Fast freezing here produces tiny ice crystals in the meat. On defrosting, this water is reabsorbed by the meat fibers, with little

dripping and full retention of original flavor and consistency.

Meat scarcity during the war caused some frozen product opponents to try the output from Armour's quick freezing facilities. Dislikes soon disappeared, and the "fresh frosted" designation of today's prepackaged meat has come to signify a new standard for frozen meat quality.

Process Varies with Items

Several types of prepackaging lines have been mechanized for volume production. The company's luncheon meats and bacon are cut into shingled slices automatically in an air conditioned room. These travel from the slicer down a stainless steel conveyor, and girls withdraw appropriate quantities for weighing. Shingles are then inserted into laminated Pliofilm and cellophane bags with the aid of a company-designed slotted paddle. Vacuum sealing in the Flex-Vac unit completes the process.

Volume production in frankfurter prepackaging has been attained through adoption of a special conveyor and machine wrapping. Girls, flanking a conveyor, place a double layer of ten franks into a four-sided cardboard tray and check-weigh. This container is then fed, as it comes off the conveyor, into a packaging machine that overwraps and seals each carton.

Setting up lines for various prefabricated frosted meats required much improvisation and study. The best temperature for slicing each meat varies. And by freezing some items before packaging, and others after, different results are achieved. Further, the time necessary for freezing and tempering vary from product to product.

A typical prefabricated frosted line—it could be beef-roll steaks, hamburger patties, boneless pork—operates in this manner:

Trimmed, boned and defatted meat is stuffed into double-wall cellophane tubing by an air-operated machine that shapes the meat into a long roll before forcing it into the casing. After tying the open casing end, these uniform-diameter rolls are racked and go into the quick freezer.

Here the —50-deg. air blasts quickly lower internal meat temperature to a predetermined value. Frozen rolls then are transferred to zero storage until needed for further processing.

Before molded meat is cut, it is tempered at a temperature just below freezing for an exact length of time. Then an Armour-modified Albright-Nell bacon slicing machine cuts the meat roll into separate identical portions. These move along a short conveyor to the packaging table, where girls tier the portions with waxed paper dividers. The quantity required for each package then is overwrapped in cellophane, hand sealed, and inserted in a cardboard carton. Quick freezing in the shipping container follows, although some products are frozen after slicing and prior to packaging.

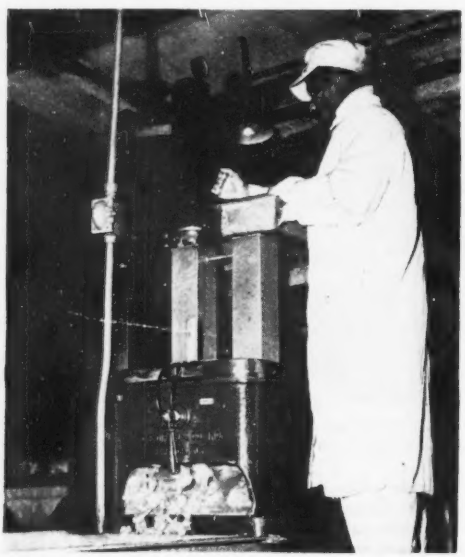
Carton Appeal and Recipes

A few years back, practically all of the company's fresh frosted items were put up in 10-lb. institutional boxes and were used primarily by cost-control-minded restaurants which wished to serve uniform portions. However, consumer-size packages containing 8 oz., or three or four portions, have proved very popular and are now diverting a large part of the output.

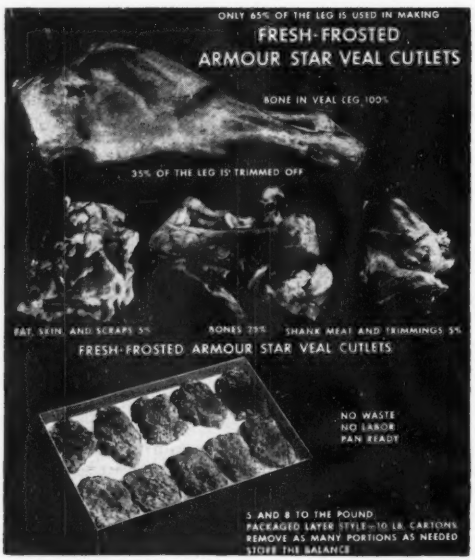
The new enclosed-type consumer carton has a unique advantage. It is easily opened for inspection by the shopper, the meat being protected internally by a cellophane wrap. It is thus effectively safeguarded from discoloration and excessive handling.

To go along with the convenience and attractiveness of these small, handy meat servings, Armour's consumer-service department has been busy developing recipes and proper cooking and thawing instructions. With this information on the carton, home cookery takes another confident hop into the "guaranteed" stage.

A few years of market study has convinced the company that its line of prefabricated meats—while developing rapidly—will not supplant established meat retailing and merchandising operations. Instead of competing with fresh meat, the package line has been found to tap a new consumer market.

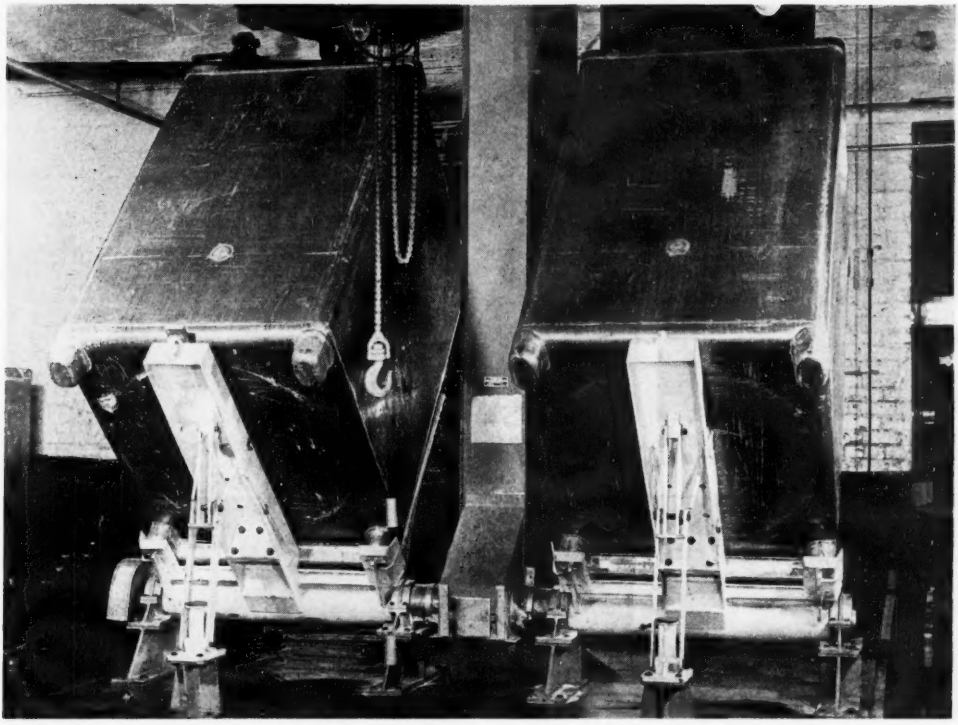


DICER cuts beef, lamb or veal into uniform pieces for use in convenient prepackaged stewing meats. This is one of several machines adapted to new operations.


ONLY 65% OF THE LEG IS USED IN MAKING
FRESH-FROSTED
ARMOUR STAR VEAL CUTLETS
BONE IN VEAL LEG 100%
35% OF THE LEG IS TRIMMED OFF
FAT, SKIN, AND SCRAPS 5%
BONES 25%
SHANK MEAT AND TRIMMINGS 5%
FRESH-FROSTED ARMOUR STAR VEAL CUTLETS
NO WASTE
NO LABOR
PAN READY
5 AND 8 TO THE POUND
PACKAGED LAYER STYLE—10 LB. CARTONS
REMOVE AS MANY PORTIONS AS NEEDED
STORE THE BALANCE

PREPARING prefabricated veal cutlets involves trimming off 35 percent of veal leg. Thus waste and labor are eliminated for consumer of pan-ready product.

Tilt—And They Empty



TOTE BINS pour dry-type of products into a closed conveyor system, thus eliminating problem of dust formation.

Big Benefits in Bin-Handling of Drys

Bulk transport system proves profitable to both processors and users of dry materials . . . Here, various operators tell of the gains they've chalked up

FE STAFF

During recent years, food processors have lowered costs by taking delivery of such liquids as sugar, corn and chocolate syrups, also caustic solutions, wax and brine, via tank cars or tank trucks.

Now, delivery of dry materials in bulk is likewise cutting costs. The method, known as the Tote System (FI, May '49, p. 92) is reducing the F.O.B. or delivered price of bulk dry materials and is minimizing handling. All told, these are the advantages:

- **Lowered delivered price**
- **Less deterioration of ingredients during storage**
- **Improved in-plant materials handling**
- **Better sanitation, no infestation**

The Tote System is built around special bins of two sizes. These containers are made of aluminum. In over-all dimensions, the larger one is 68⅝ in. high, 42 in. wide and 48 in. deep. Its capacity is 74 cu. ft., permitting a load of from 3,000 to 4,000 lb., depending on the product. The smaller bin carries between 1,500 and 2,500 lb.

Supported on legs, the bins are easily handled by industrial fork trucks or lift trucks. Reinforcement at the corners allows stacking them, when desirable.

Each bin is filled through a round hole at the top, and discharge is through a hinged door at the bottom of the front side. Both openings are closed with hermetic seals.

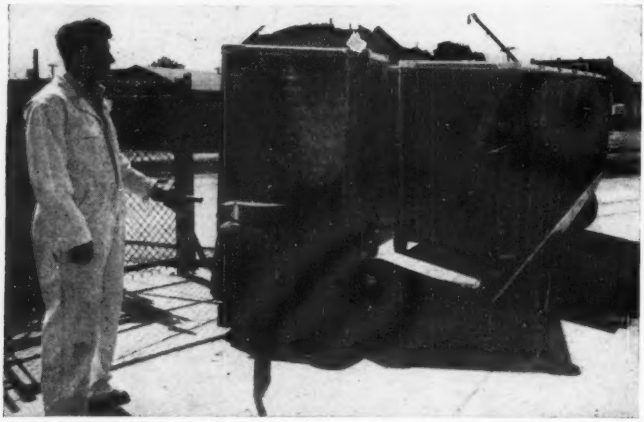
At present, bins are employed for bulk transportation and in-plant movement of such dry materials as sugar, flour, powdered milk, cocoa and salt. Use is by bread and cracker bakers, chewing gum and candy manufactorers, syrup manufacturers, canners, and bottlers.

How Bins are Used

Empty bins are loaded by lift truck onto a flat bed automotive truck and transported to the refinery or mill for

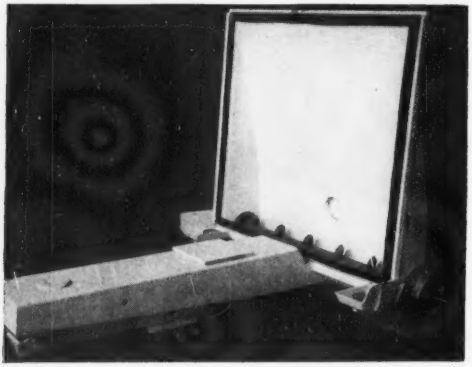
Bulk Sugar Sequence: Six Steps from refinery to process

1 **BINS** are filled at refinery from spouts, need not be taken off truck.



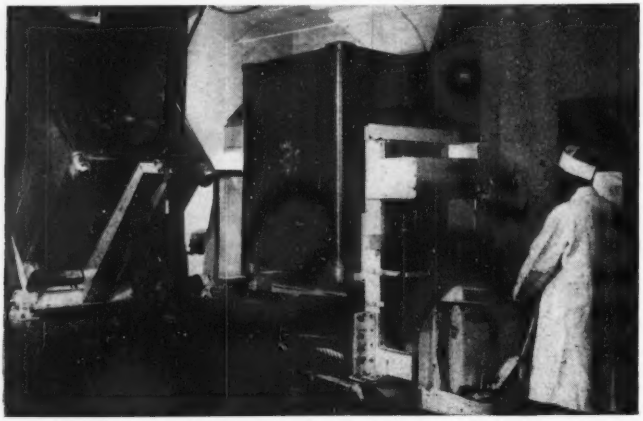
2 **LOADED BINS** are trucked to processing plant, where they are unloaded in 40 min. Power trucks quickly transport them to warehouse.

3 **DOOR** (on bin, left) provides for discharge of contents. Hermetically sealed, it is opened by special wrench.



4 **TOTE-TILT** device, which angles bin to facilitate pouring. It forms dust-tight seal between bin and tilter.

5 **OPERATOR** unlocks door with key inserted through housing.



6 **TWO-BIN** operation permits continuous feeding of drys into system. There is ample time for connecting second bin as first discharges.

loading. Tare weight of large bins is 225 lb. Number of bins carried on the truck varies with the load limits of the locality and with the needs of the different users. Truck load for Utah-Idaho Sugar Co. is 9 large bins or 17 small ones. Net weight of sugar transported by this company on each truck load is 34,000 lb. As much as 40,000 lb. is hauled by Pride Trucking Co., delivering sugar to three bin-system users in Metropolitan New York.

Time required to hand-load 20 tons of sugar in bags at the refinery varies (according to conditions at the loading dock) from 1½ hr. to 3 hr. Unloading bags by hand at the plant takes 2 men 4 hr.

But only 50 min. is necessary for filling bins with the same amount of sugar at the refinery, and also weighing in and out. And it only takes 1 man 30 to 40 min. to unload the bins

Loading at refinery or mill is from bulk storage, through filling spout, directly into the bins. Price reduction, allowed by the supplier for purchases F.O.B. in bulk, usually runs 16 to 20c. per hundredweight. When unloaded, the truck returns to the plant, where the bins are unloaded by fork or lift truck for the trip to processing line or storage.

Emptying bins may be done in several ways. They may be unloaded into a hopper, a chute feeding a hopper, or onto a conveyor belt.

Even though the flow from the bin can be controlled at the bin discharge opening, dusting, with some types of materials, may be expected when any of these open type systems are used. But discharging bins into screw conveyors, with the aid of Tote Tilts, overcomes dusting. Latter are tilting devices that form a dust-tight compartment against the bin and around the screw conveyor. The tilts are lifted by overhead electric hoist or hydraulic lift from underneath. A safety locking mechanism holds the bin in tilted position until empty.

Discharge door of the bin is opened by a special wrench, inserted through the Tote Tilt front, when the bin is in place on the tilt. After bin door is unlocked and wrench withdrawn, wrench hole is sealed. Bin is then tilted to empty.

When angled, the bin exerts pressure against the forward support of the tilt, tightly sealing the area between the bin and discharge mechanism. Bin contents flow at uniform rate into the screw conveyor, without dusting, and from it go on to destination in a similar closed system.

Owner of many hundred bins, Utah-Idaho Sugar Co, transports sugar in them to those customers with facilities for in-plant handling of sugar in bulk. From its plant in Toppenish, Wash., bulk sugar is trucked in bins to Nally's, Inc., whose plant is 180 miles from the refinery. The latter uses sugar for the production of table syrup and mayonnaise.

What Users Say About Bins

Advantages of the bin system, according to Utah-Idaho, are numerous. Delivery costs are lowered, with no possibility of contamination of product in transit. Neither will the product in the bins deteriorate in storage. And, in bins, sugar can be stored in otherwise unusable dead space, or even out-doors. No matter where stored, sugar in bins takes less floor space than sugar in bags.

Spillage, which normally results when paper or cloth bags are emptied, is absent. Avoided also are the losses incurred when bags are torn or ripped. And lastly, neither buyer or seller bears the cost of bag containers, nor faces the problems of handling and disposing of them when empty.

These are usual, to-be-expected advantages. However, a benefit pointed out by Imperial Society Candy Co., Seattle, may be considered less common. Says Imperial: "Being prefabricated, the equipment was installed

SYSTEM is sanitary, floors spotless.

in our plant while we were in operation. There was no loss of production during transition". Utah-Idaho Sugar Co. supplies sugar in bins to this company.

A report of Interstate Bakeries Corp. provides detailed information on the application of the bins in handling flour: "At the present time, most of the flour for this plant comes from a mill in Lincoln, Neb., 60 miles away. We have found that our best method of delivery is by using our own truck. Our driver leaves the plant the first thing in the morning with ten empty bins. He goes to the mill, leaves the empty bins, and picks up ten bins each filled with about 3,000 lb. of flour. Then he returns to the bakery and is unloaded just after noon. The bins are transferred by lift truck to our freight elevator for warehousing upstairs.

"We have located our Tote Tilt discharge mechanisms as close to our mixers as possible. Two of them feed to a central screw lift, which feeds the flour to a sifter discharging into our traveling scale hopper. When the correct amount of flour is fed into the scale hopper, the feed is automatically shut off.

"In order to insure complete product discharge out of the bins, we use a Syntron Vibrator on each tilt. When a bin is emptied, one of our mixer men takes it off and replaces the empty with a full bin. This operation takes only 3 or 4 min.

Baking, Economies, and Sanitation

"The following are the three main factors we watched for in our first installation: 1. Baking characteristics, 2. economies, and 3. sanitation.

"As for *baking characteristics* we found that, at last, we had the means and control to turn out a better, more uniform product. Since our bins are filled and emptied every seven to ten days, our flour has an average age of about five days. Holding flour for a longer or shorter period has no apparent effect on baking characteristics, due probably to the air tightness of the bins, which hold uniform the moisture content of the flour as it comes from the mill, regardless of storage conditions.

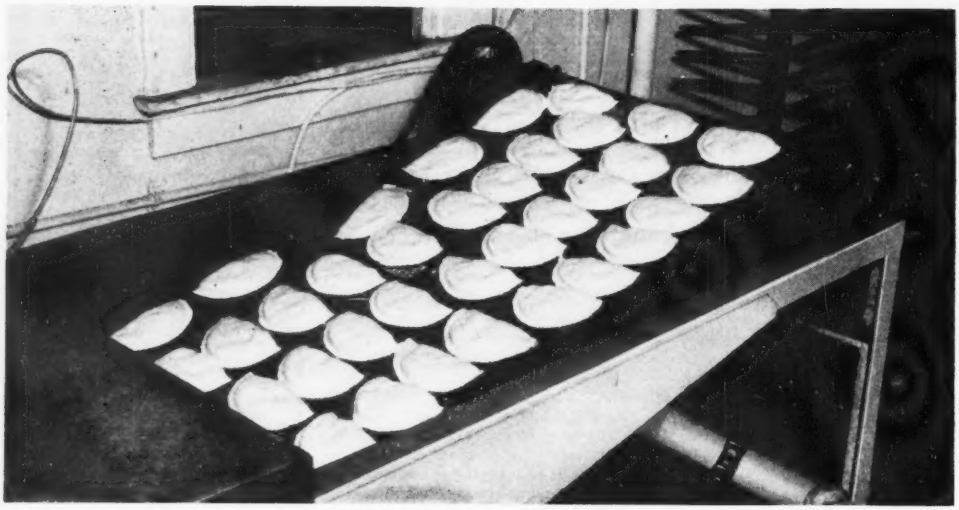
"Water adjustment at the mixer has been eliminated. Mixer clean-up time and dough characteristics are now uniform—from batch to batch, day to day, and week to week.

"Since the mass of flour held in each bin is large, the temperature remains at a relatively high and uniform level. It is no longer necessary to hold flour for a long period of time to bring it back up to temperature to make it ready for use. The former problems of flour age, moisture, and temperature have been practically eliminated.

"Regarding *economies:* In addition to doing away with our bag costs, the Tote System has resulted in many other substantial direct savings, such as reduced labor in handling, warehousing, dumping and clean-up. It has stopped product loss, and it has conserved warehouse space and saved the cost of carrying a large flour inventory. These economies will permit us to pay off our total investment in less than two years.

"Concerning *sanitation:* Handling flour in an aluminum container that

(*Turn to page* 179)



PIE IS FRIED on steel screens, shown here being continuously lowered into oil bath by chain conveyor. Controller bulb is seen dipping into oil at feed end. Note portable screen rack (upper right).

Engineering Pegs Popular Price

New streamlined process using company designed units economizes mass output of fried pies—to maintain inviting 10¢ tag that keeps the demand flourishing.

GEORGE W. MASSEY
FE Correspondent, Nashville, Tenn.

A food item's striking taste-appeal won't win the whole battle. Usually, it's the price that finally determines whether the product will be a commercial success.

Recognizing this, most food processors try to pare their unit profit down to an almost laughable margin and rely on efficient, streamlined volume production to stay on the black side of the ledger.

This is the story of such a product, and how its engineering-minded manufacturer has managed to keep a modest consumer price in these days of soaring costs.

For the Siegrist Pie Co. of Nashville, Tenn., still offers a real 10c. value for today's dime. This is the Fried Pie—a full 8 oz. of fruit-filled, individually wrapped pastry.

How do they do it? By an efficient, integrated production line, the heart of which is a unique company-designed continuous pie frying machine. Four major benefits are credited to the plant-conceived technics:

- **Vastly improved uniformity and quality in finished pies.**
- **Doubled production with halved labor requirements.**
- **Considerable savings in fuel and cooking oil.**
- **Great reduction in losses of material and labor through fewer cooking accidents.**

A brief of the "old way" will give a perspective of the basic operation, thus clarifying the recent rapid strides in fried-pie production:

Commercial production of fried pie was started by the company after the first World War. At that time it was an over-the-counter item, but its appeal soon broadened the market and made fried pie a staple item on many lunch counters throughout the South.

Initial production was almost entirely manual. Hand rolling pins shaped the crust dough. Hand operations fil'ed the pies and sealed the edges. And hand-held baskets of pies were lowered into the cooking oil kept hot over a charcoal-fed candy furnace.

The full time services of 9 workers produced about 25 doz. pies per hour at a cost which would be prohibitive in today's highly-competitive markets.

As the fried pie grew in popularity, greater production became a prime concern. First effort toward mass production was "to graduate" from the individual handling of each pie. A primitive mass output technic was then envolved whereby various functions were performed at a rotating table. Each worker stationed around this table performed a single, different hand operation contributing to making the finished unit.

Evolves Modern Line

In this interim period of manufacture, six persons operated at the pie-forming table, as follows:

Worker 1—Rolled the crust dough.

Worker 2—Moistened the edges of each crust.

Worker 3—Put the fruit filler in half the crust.

Worker 4—Folded the other half of the crust over the filling.

Worker 5—Trimmed and sealed the pie in its moon-shaped form.

Worker 6—Placed the pies in racks for cooking.

Three other persons were required

at the frying operation, which consisted of removing pies from the racks, placing them in dip baskets, and cooking them in gas-heated fryers of the standard basket type.

Using this speedier technic, the same nine persons had now more than doubled their previous production, the new rate being 60 doz. pies per hour.

Processor Designs Continuous Line

As distribution improved and fried pies "took hold" throughout a larger trading area, even this round-table system became inadequate. This stimulated Carl Siegrist, engineering-minded manager of the business, to visualize a truly continuous process. He outlined his plans on paper and commissioned the Englert Engineering Co. of Nashville to further formulate his ideas and fabricate the equipment.

Today's mass-producing fried-pie line then took shape. And after all the specially built equipment was installed and the inevitable kinks ironed out, Siegrist's new system was turning out 160 doz. pies hourly.

He had achieved a production gain of over 250 percent and had cut his labor costs almost 50 percent.

At first glimpse of the new set-up, one is struck by the layout's simplicity —seeming almost to belie the high production figures. For the basic production line encompasses merely a moving pie-forming belt, a continuous cooker, and a product packaging station.

But closer scrutiny of the operation reveals how faster, automatic technics now eliminate many of the operations previously done by hand.

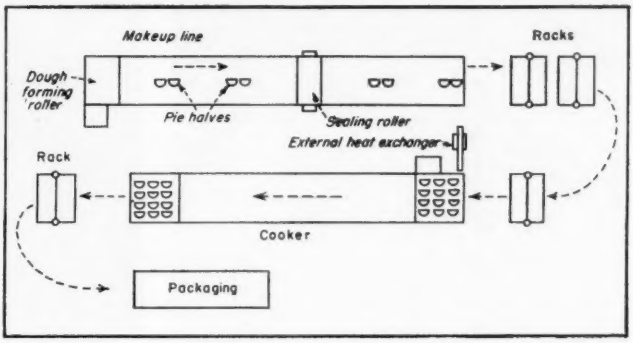
A set of rolls is at the starting end of the 25 ft.-long pie forming belt. An operator puts in dough balls, and rolled crust dough emerges. The same attendant now places this dough in **half moon-shaped** forms that have fluted edges on the curved portions.

The dough-bearing forms, spaced evenly along the moving belt, next go by a second operator, who fills them with fruit from a convenient pan bridging the belt. Folding-over of the dough crust is performed by a third attendant farther down the belt.

The pies then proceed to thermostatically controlled, heated rollers. Heat and pressure from these rollers seal them along the fluted edges, simultaneously trimming off excess dough.

At the end of the forming belt, uncooked pies are removed from the forms, and are placed, two at a time, on steel cooking screens. The attendant performing this operation also places the screens in tiered racks which, when filled, are moved to the cooker. Continuous material flow is effected at this point by carefully placing the feed end of the cooker adjacent to the uncooked-pie storage racks, which in turn are next to the end of the forming belt. This belt has been designed to handle a maximum of 220 doz. pies per hour to the cooker.

Set-up Is Simple



Cooking Is Critical Step

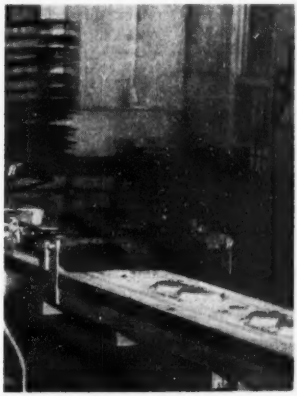
Actual pie frying takes place in a rectangular tank, about 20 ft. long, 30 in. wide and 16 in. deep. Two 30-in. drip aprons are located at the loading and discharge end of the unit. Pies are conveyed by a 24 in. wide moving rod chain that takes the pie screens through the cooker.

Screens are started through the cooker by an attendant, who first removes them from the tiers, then places each one on the moving rod chain as it passes over the feed-end drip apron. The pies are then immersed in the hot oil bath by the moving conveyer, which carries them through at a uniform speed.

When the product emerges from the cooker finishing end, the screens are again placed on the tiered make-up

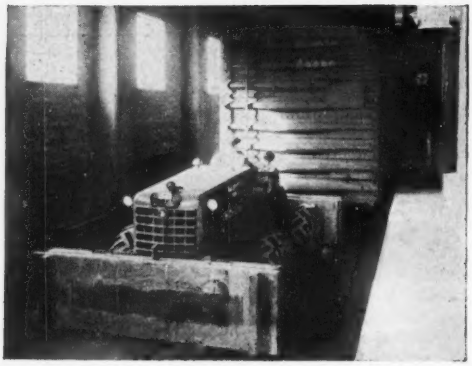
(*Turn to page* 199)

ROLLER machine (foreground) shapes dough balls into crust dough, which then goes in forms. A girl at mid-belt inserts filling, another folds.



CLOSE UP of gas-heated roller which seals the pies at the fluted edge.

FAST CROSSING of intersection for train of empties is one of many chores of heavy tractor.



SLIPPING a loaded car inside an interior dock capitalizes on small size of multi-purpose power mover.

DOES OUTSIDE JOBS QUICKLY

Modified tractor-shovel saves time, cuts production delays by moving boxcars rapidly. Clears snow, moves coal, lifts car heaters and speeds construction work

FE STAFF

Seasons and situations create diverse and often formidable materials handling problems for most food plants.

In rainy or wintry weather, bulk movements of outgoing products and incoming materials must go on despite mud and snow. And often, a materials handling problem appears in the movement of snow itself.

Plant conditions of the moment also complicate routine handling of materials. A shipment of coal is suddenly dumped and must be moved to less obtrusive storage. Or a block-up of shipping tracks during peak production may necessitate high-speed car switching.

Small wonder that effective equipment to expedite material movement is considered a No. 1 production tool in most plants.

Ingenious Application

For Miller Brewing Co., the judicious selection and alteration of an industrial tractor was the solution to a myriad of problems. Ingenious use of this plant-modified multi-purpose mover has saved the company thousands of dollars.

Here are some of the things that it accomplishes:

Moves railroad cars—by pushing or pulling, up to 10 at once, through mud and snow. It pulls derailed cars back onto tracks.

Loads and transports materials—fills coal trucks, removes refuse, carries construction materials, and lifts heaters to top of reefer cars.

Performs construction jobs—excavates, grades ground, backfills, and is used to set bulky, heavy pieces of equipment into place.

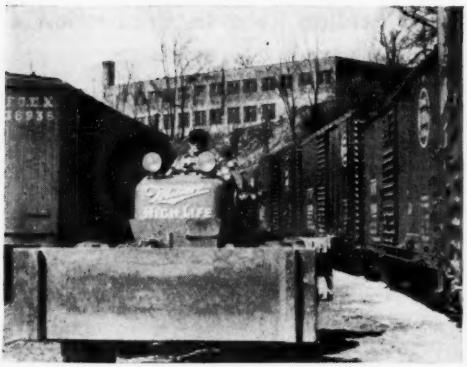
Clears snow—from yards, roads, parking lots and city streets, by plowing, loading into trucks, and finally pushing dumped snow into river.

Company officials recognized that railroad yard and associated heavy-duty outside moving jobs had a common solution. And while no commercial unit exactly met the diverse requirements, the specifications of a company-owned Hough tractor-shovel offered possibilities. This standard industrial unit was exceptionally heavy—12,000 lb. It was equipped with a four-wheel drive, 76-hp. motor and eight gear-shift positions—all inherent heavy-mover qualities. And it could push, pull, lift, carry or scrape. So it was adapted to Miller's purposes.

Shipping Problems Bested

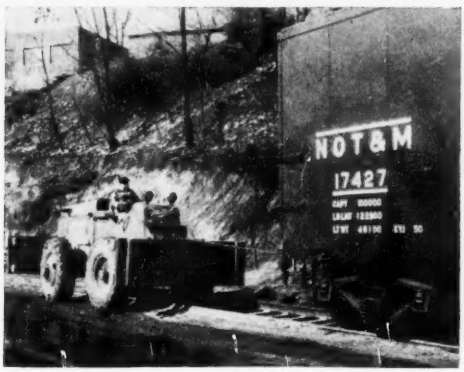
To convert the tractor-shovel to yard switching operations, its hydraulic shovel was replaced by Miller-designed 5,000-lb. steel pusher-type bumpers, at both ends of the tractor. These enable it to push—as well as pull—empty and loaded cars in both forward or reverse directions.

Fast car switching is important. At peak production, the brewery loads over 900 boxcars monthly directly from the bottling house. If empty cars are not ready at the loading dock, bottling has to stop. Some 2,500 to 3,000 boxcar movements occur each month—and



PULLING a string of cars with side-mounted tow chain saves time and avoids production delays.

LIFTING heaters atop refrigerator cars—easy accomplishment of former back-breaking manual operation.



TUGGING backwards against trainload to slow speed on down-grade is another useful chore.

LOADING coal, snow or rubbish into trucks is easy work for hydraulic shovel attachment.

they must be made without any delay.

Adding to this big job of moving cars about is the fact that the company's yard tracks not only encompass the plant in a sharp curve, but also approach on an up-grade of about 6 deg. These conditions greatly add to the chore of car movement.

Prior to adaptation of the tractor-shovel, all car movements were handled by a switch engine—involving a rather expensive investment. Further, this track-bound unit wasted considerable time traveling from point to point through track switches. And in the yards the distances to cover are unusually long.

Today, car switching operations are meshed with bottling production and greatly simplified. The converted tractor-shovel has proved useful in all yard operations. And its 24-mph. speed and short turning radius have quickened the tempo of track activity.

Formerly, when loaded cars jumped the tracks and blocked operations, a costly emergency operation confronted Miller. To clear the tracks an outside crane had to be located and hired. But now, two movers are coupled together and quickly pull the derailed car back into service.

Many Other Duties

In addition to car moving, many other outside chores have been found to fall within the tractor-shovel's scope. It stockpiles, loads and transports coal as heating and beer production demand. It piles, scoops up and removes rubbish—including the fair amount of broken bottle glass that is a normally hazardous brewery clean-up operation.

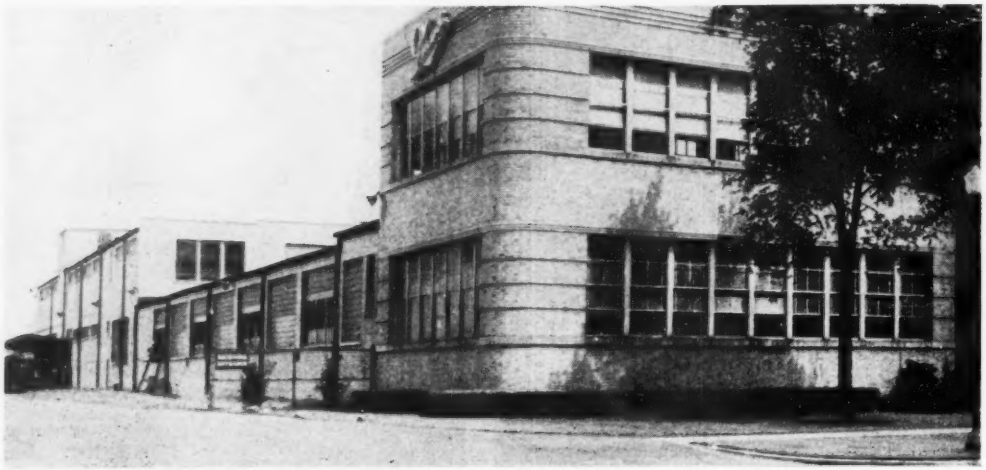
Another interesting function for the unit has been in the company's construction program. It provided material assistance in preliminary excavation, hauling, pipe laying and filling for several new buildings. One day it was also used to set a 15,000-gal. oil tank in place—an expensive job usually requiring a contractor and crane equipment. On another occasion, it dug out the entire steep bank of a retaining wall and saved thousands of excavating dollars.

Snowfighting is yet another talent of the versatile unit. After a paralyzing 9-in. storm last winter, it cleared the yard and all roads and streets surrounding the plant. Then it removed snow from a one-half mile hill road leading to the plant. With the yard freed for car movement and entry available to delivery trucks, operations then proceeded without halt in a period which would normally involve considerable lost time.

Miller's snow clearance now involves loading 5-ton trucks that travel a mile to the river bank for dumping. The multi-purpose mover not only scoops up the snow and dumps it into these trucks, but it also runs down to the bank and finishes the job by pushing the snow into the stream.

Miller now operates four heavy power movers—two with the hydraulic scoop attached and two equipped with bumpers in place of scoops.

Modern Equipment Has a Stellar Role In Production of



HOUSE OF 1,000 FOODS

Variety Poses Tough Planning Problem But Advanced Engineering Solves It

Sanders of Detroit efficiently produces host of small-volume items for fresh daily delivery to company outlets. Success of 76-yr. business has been built on quality products at reasonable prices

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

Speaking of *difficult* food-processing jobs, consider the assignment that is shouldered by the Detroit plant of Fred Sanders, Inc. It must produce more than 1,000 different items. And all these foods have to be top-quality to satisfy the discerning customers of the firm's attractive local retail shops.

Policy of the management over the past 76 years has been to manufacture fine foods to sell at reasonable prices. Working through its own retailer outlets, the firm maintains a rigid control over the freshness of its foods from production to consumption.

Most products must be sold on the same day that they are produced. Otherwise, trucks making morning deliveries must pick them up. These returns, which amount to approximately 250,000 lb. annually, are sold cut-rate to workers or given to orphanages.

From a one-store beginning, Sanders steadily expanded into a comprehensive organization. It now operates a large food-processing plant, supplying 32 retail shops that serve 14,000,000 customers annually. Total sales last year grossed about $15,000,000.

Sold in the retail shops are candy, baked goods, and ice cream. Light lunches, sodas, and sundaes are served in all but three of the stores. Also, a carry-out service has been set up for soups, stews, salads, casseroles, baked foods, and desserts. And a special-order department in each store handles individual requests for fancy molded ice cream, anniversary or wedding cakes, and various special party items.

Production is carried out in a $1,500,000 plant built in 1940. In this building, affording a full nine acres of floor space, there are conducted the many food-processing operations of the company's candy, bakery, ice cream, and commissary departments.

Now for a step-by-step account of production in these four departments:

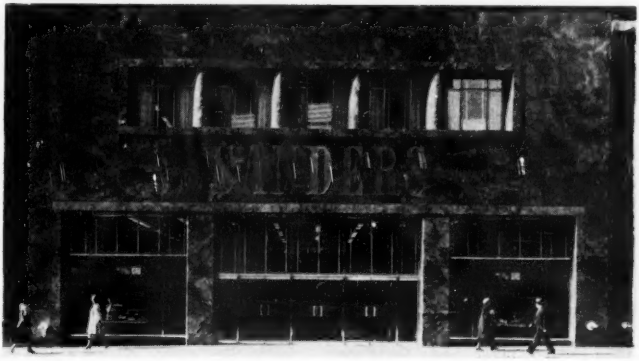
In the candy department, modern processing lines have been installed to keep labor and production costs competitive with other confectioners. Used are specific units and equipment most suited for the processing of small amounts of over 500 varieties of superior quality candies. Sanders' total production of candy last year was about 6,000,000 lb.

Making Centers

For enrobing work, cream centers are first prepared in two 100-gal. steam-jacketed kettles. Here, sugar is added and corn syrup, liquid sugar, and water are metered into the kettle. Ingredients are then pre-cooked to temperatures that vary according to the kind of centers to be made. Also made up in these kettles are fondant and icings

Extensive Quality-Item Line In This $1,500,000 Plant

One of 32 Outlets It Serves



for the bakery department, as well as hand-rolled creams.

Each batch of pre-cooked cream centers is drawn into a 300 lb.-capacity Simplex vacuum cooker in which the confection is concentrated 10-12 min. under 29½ in. of vacuum. From the vacuum cooker, the batch is gravity-fed to a ball beater, where it is first cooled to about 92 deg. F. Then frappe (a cooked and aerated albumin-sugar mix) is added and the batch is beaten until it becomes creamy.

If icings are to be made, flavor, color, chocolate, butter, and other ingredients, are added to the batch, which is ball-beater aerated until it is creamy. Icings are then filled into metal containers for shipment to the bakery department. In making fondant, each batch of cooked sugar-corn syrup-tartar mix is cooled and then aerated in the ball beater for 8 to 15 min.

Cream centers are held until ready for casting. And before they are cast in starch trays, a batch is remelted in a 50-gal. metal bowl set on top of a gas flame. At the same time, flavor, color, and fruit acid are added.

Starch-Casting Creams

The bowl of cream-center material is then raised by electric hoist and transferred by trolley on an overhead monorail to a Mogul depositor. Cream is then dumped into the hopper of this machine, and there follows automatic casting into starch molds, in this manner:

Empty trays, automatically fed to the depositor, are filled with starch. Then impressions are made in the starch and a single-row depositing pump feeds centers into the molds. Trays then go to an automatic stacker that loads two rows of 60 trays on a skid. Later, the trays are transported to an air-conditioned drying room, where they are held overnight at 70 deg. F.

After the creams have set in the molds, trays are removed from the drying room and delivered to an automatic loader that feeds them onto a chain-belt conveyor going through the depositor. Here, each tray of centers is automatically inverted. The candy is screened from the starch and delivered to the side of the machine, where they are inspected and loaded into other trays. Inside the depositor, empty trays are then turned right-side up and refilled with starch that has gone through a cleaning and drying process.

The casting cycle then repeats—impressions made in starch, centers deposited in molds, and trays delivered ready for stacking.

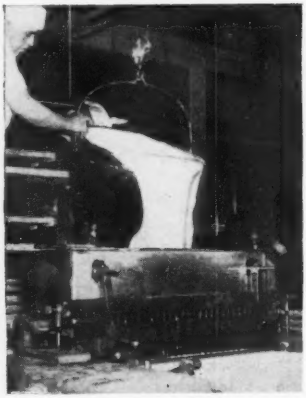
Automatic coating of the centers with melted, tempered, chocolate is next. Also chocolate-coated are nuts, fruits, caramels, nougats, and combination centers (cream with coconut, fruit, nuts, marshmallows, or gum jellies). Total number of chocolate-coated items produced is about 180.

On to Enrobers

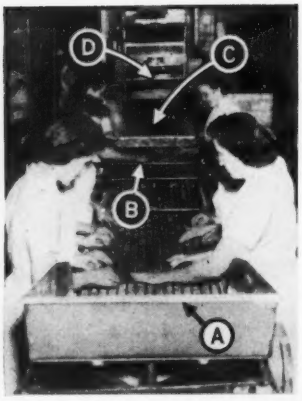
Items to be coated are dumped into two oscillating hoppers, each spacing them in rows on conveyors. Continuing on the belt, the centers or other items pass over a bottomer. Here, a

Chocolate Candy Processing Line in Action

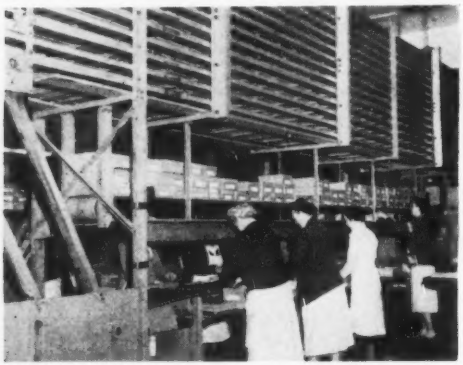
PREMELTED cream centers are concentrated in vacuum cooker (A), then aerated in ball beater (B).



CREAM-CENTER CANDY is emptied into hopper of Mogul machine, which deposits it into starch molds.



FEEDER (A) lines up candies as they go to bottomer (B), cooling belt (C), and chocolate-enrobing machine (D).



FROM ENROBER, chocolate-coated candies are cooled in space-saving multi-tier unit (top), then go in stock boxes.

IN THIS air-conditioned room, various assortments are packed from stock boxes into fancy cartons.

thick coating of chocolate is applied to the bottom of the candies as they come in contact with a large diameter roll. Chocolate is picked up by the roll from a water-jacketed, thermostatically controlled tank.

A 20-ft. canvas-belt conveyor then carries the bottomed centers over a Freon-refrigerated (25 deg. F.) slab for rapid setting of the chocolate. Candies now go to Greer enrobing machines, each equipped with automatic temperature controls, fans, and mechanical shakers that give the desired finish to the chocolate coating. Coated candies then proceed to a continuous multi-tier cooler, installed in an air-conditioned room (68 deg. F.). Candies coming out of the enrobers are automatically transferred onto 24x48-in. oil-cloth plaques, which are chain-belt conveyed through the cooler. Travel through this unit is at the rate of 600 ft. in 1¼ hr.

After the candies are automatically unloaded from the cooler, they are packed into 6-lb. paper stock boxes. Then the packed candies go to a refrigerated holding room (50 deg. F. and 40 percent relative humidity), later to be packaged in retail boxes or shipped to retail stores, where they are finally counter-packed for customers preferring their own assortments.

Getting Coating Ready

Chocolate is prepared for enrobing this way: Ten-pound slabs of chocolate are dumped into three steam-jacketed melting kettles, equipped with vertical mixers and thermostatic temperature controllers. Milk chocolate goes into a 1,000-lb. kettle, dark and semi-sweet chocolate into two 500-lb. kettles.

After the chocolate is melted at 117 deg. F., it is pumped into six 1,000-lb. tempering kettles, located directly above the enrobers. These kettles are also equipped with mixers and temperature controllers. Tempered to 90 deg. F., the chocolate is then gravity-fed to the enrobers.

Packaging of the chocolates in an air-conditioned room is done manually. There are 13 packing tables, each with two inclined packing racks containing 27 stock boxes of the different varieties of candies. From each rack, two girls pack 15 to 20 different kinds of candies from stock boxes into fancy retail cartons.

Wrappings vary seasonally, special colorful papers and ribbons being employed for holidays. During the Fall season, a conveyor system is set up for packing chocolate-coated nuts, cream centers, and fruits into fancy boxes.

Approximately 16 different types of brittle candies (made with peanuts, glazed nuts, butter, and toffee) are

produced. Brittles—much improved in flavor—are prepared by cooking the nut meats directly in the syrup. The corn syrup and liquid sugar mix are cooked to 240 deg. F. in two 40-lb. kettles heated on gas-fired open furnaces. Flavor is now added to the brittle, which is then poured onto a warm slab. Brittles are next stretched by hand to make them thinner and more tender.

The cooled brittle is cut into squares with a hand-operated, triple-blade rotary cutter. Squares are then packed 5 lb. to a stock box. In making butter-almond toffee, a pound of butter is added to each pound of sugar.

Caramel-Making Steps

Manufacture of caramels that do not require individual wrapping is accomplished through the use of a company-developed cream mix that extends their shelf-life. In addition to the ten different types of caramels, there are also produced four kinds of fudges and as many different nougat candies.

Here's how the caramels are made: Liquid sugar and corn syrup is metered into two 50-gal. steam-jacketed kettles, equipped with vertical mixers. As these ingredients are cooked, the cream mix is slowly added in small quantities until the batch is of the correct consistency. The candy is then poured on cooling slabs and cut into 12x12-in. squares. Next, the squares are fed to a caramel cutter that slits them into rectangular pieces at the rate of 290 lb. per hour.

In the hard-candy department, over 100 different kinds of lollipops, and solid, filled, and chip candies are made. Liquid sugar, corn syrup, and water are first precooked to 240 deg. F. in two 50-gal. steam-jacketed kettles. Then the batch is fed to two vacuum kettles, where it is cooked for 12 to 15 min. under 29½ in. of vacuum. Hard candy is next poured onto slabs, where color and flavor are mixed into the batch and stripes are applied.

Moving on to batch rollers, the hard candy is fed to two plastic-type die machines or three Racine cutters. The plastic machines die-compress the candy into different forms. Individual pieces are then cooled on a triple-tier wire-mesh conveyor that carries them into an air-conditioned packaging room. Temperature of this room is 70 deg. F. and relative humidity 35 percent. The candies are finally packed either in glass jars or cans.

In contrast, the Racine machines cut the candy into various lengths. Pieces are then conveyed on a 30-ft. canvas belt to the air-conditioned packing room.

Special candies such as sugar wafers, chocolate butter fudge, and crystallized creams are made in separate rooms. In making sugar wafers, special wafer-cream mix is melted in 20-lb. capacity copper bowls, mounted on gas-fired open furnaces. As the cream melts, flavor and color are added. The candy is then dumped into the hopper of a machine that deposits flat-wafer pieces onto rubber mats.

Each mat is then placed in a wooden tray, and trays are loaded in racks. After the wafers harden, they are removed from the pad and assortments are packed into ½-, and 1 lb. retail cartons and 2¼-lb. stock boxes.

Butter fudge is machine-deposited into waxed paper cups held in holes that have been drilled in wooden boards. Fudge is then cooled on racks, removed from boards, and packed 2¼-lb. to a stock box. Finally, the candy is stored, ready for shipment to the packaging department.

In making crystallized creams, the candy is first cast in starch, then cooled in an air-conditioned room. Cooled creams are then surface-crystallized in syrup. Approximately 2 lb. of creams are placed in metal pans, which are then tiered five high on sloping metal tables. Syrup (32½ deg. Baumé) is poured into the trays of creams before they are tiered, then a girl covers each tray with a perforated sheet of paper to submerge the candies. Surfaces of the creams crystallize while the candy is left over night in the syrup. The next day, creams are removed from the trays, and drained for 1 hr. in a metal trough. Creams are then reloaded into trays and dried for 1½ hr. before they are packed 3¾ lb. to a stock box.

A separate department processes nuts used for confections and baked goods. Nuts are inspected on a modified bean-type sorter. They are then dumped into a floor-level hopper and bucket-conveyed to an automatic sifter that removes dust and chaff. From here, the nuts go to a horizontal rubber belt conveyor that services 12 hoppers feeding sorting belts. As the nuts travel along the sorting belts, girls pick out culls and deposit them into baskets. Good nuts are conveyed into drums.

Nuts then go to either: (1) A comminuter that grinds them for topping; (2) a dry roaster that roasts them; or (3) an oil roaster that cooks them in coconut butter.

Prepared daily in Sander's three circular and four single-lap ovens are approximately 140 different kinds of baked goods. Total production last year amounted to 13,000,000 lb. Products manufactured include breads, muffins, rolls, doughnuts, pies, turnovers, puffs, pastries, tarts, cookies, and cakes.

Steps in Bread Making

Production of baked goods starts with the mixing of five different types of flours—whole wheat, rye, blended

A Borrowed Barrel of Sugar

—to make his first 5-lb. batch of candy started Fred Sanders in business back in 1875. Soon his trade was growing, and before long he was so busy handling customers during the day that the candy had to be made at night. Called into use was the kitchen of his summer home—where, on one occasion, his wife had to hold an umbrella over the kettles to fend off rain dripping through a leaky roof.

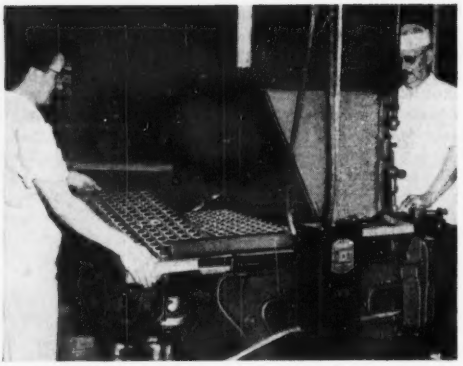
Happy Switch. **Sanders became celebrated during those very first summer months when, it is related, he originated the ice cream soda. It was all by accident. At that time, the popular drink was sweet-cream soda—a mixture of cream, soda water, and flavoring. One warm evening when he ran out of cream, he substituted ice cream. Sure enough, this switch made an immediate hit. The idea spread from fountain to fountain. Customers the country over still came back for more, and will keep coming.**

Henry Gives a Hand. **The store Sanders operated was one of the first to use electricity. But when the electric motor failed for the tenth time in a week, he threatened to re-use his gas engine unless the electric company fixed the motor. The electric company sent one of their young engineers—a fellow named Henry Ford—to put the motor in working order.**

From Gradual to Spurt. **A second store was added in 1915—soon after Founder Sanders died—and a third in 1919. By 1930, there were 12 stores. Today, the number has been increased to 32. The building in which processing was carried out was enlarged in 1915. However, it was necessary to add another three stories to the building in 1919. Business then increased so fast that it was necessary to purchase the department store next door to get needed space.**

Finally the Big Plant. **To fill the demands for the company's popular candies, baked goods, ice cream, soups, stews, sandwiches, and light lunches, the present $1,500,000 processing factory was constructed in Highland Park, Mich., in 1940. And since then, there have been continuous additions of advanced equipment and technics, keeping the firm abreast of modern processing practices.**

CRYSTALIZING CREAMS. Onto candies in pans is poured syrup. Sugar then crystallizes on surface of confections.



MACHINE deposits butter fudge in fluted paper cups. Latter are set in holes drilled in thick wooden boards.

bread, special home-made, and coffee cake blends—in an automatic blending machine. Twin-worm screws carry the different flour blends to a bucket elevator that feeds them to metal storage bins (four 4,000-lb. and one 1,000-lb.). To re-dress and remove any foreign matter, the flour is screened through an all-metal gyrating sifter. From here, the flour goes to a scale hopper holding 400 lb. Here flour is then automatically weighed by electrically controlled scale.

In making breads and rolls, the scaled flour is emptied into three Artofex mixers. Yeast, malt, and water also are added. After the batch is blended for about 3½ min., the sponge is transported to a fermenting room holding 18 mixing bowls. Sponge is fermented at 80-82 deg. F. and 74-75 percent relative humidity for 2½ to 3 hr., and then it is returned to the mixers.

Next, the dough is prepared. The other ingredients—sugar, salt, shortening, milk solids, and more flour—are added and mixing proceeds for about 15 min. Dough then goes to the fermenting room to rest for 30 min. before the make-up operation.

At this stage, bread and rolls are made up on separate lines. Twelve different breads—rye, white, Vienna, whole wheat, cracked wheat, pumpernickel, old-fashioned, banana, nut, cinnamon toast, salt-rising, date and nut—are made in this manner:

A hoist lifts the bowl over the divider hopper and the dough is dumped in. The two-pocket divider cuts the dough into small pieces, which are flour-dusted before they go to the rounder. Leaving the rounder, balls of dough are next delivered to a six-pocket, overhead preliminary proofer. Proofing takes about 15 min., the dough making four passes through the unit.

From the proofer, dough is chuted to the molder, where it is shaped into loaves that are then deposited into greased pans. Next, the panned dough is loaded onto racks, which are rolled into a 10-stall proof box holding 30 racks per stall. This proof box is equipped with ultraviolet lamps. After the dough is proofed 55 min. at 86 deg. F. and 80-82 percent relative humidity, it is baked in multi-cycle tray ovens at 425 deg. F. for 50-55 min., precise time depending upon the variety of bread.

Separate Roll Line

Briefly, the production of rolls proceeds in this way: The mixing bowl is raised over the hopper of a Baker-Perkins automatic divider and rounder by electric hoist and dough is dumped in. From the hopper, the dough drops into an 8-pocket molder-rounder that shapes it into balls. Cam-actuated plungers push through the bottom of the pockets, forcing out the dough.

Next, a stationary knife scraps the eight pieces of dough off the roll. Dough pieces then drop into rubber rounder-loops mounted over a canvas-belt conveyor. The gyratory motion of these loops also forms the dough pieces into balls that are then fed into an 8-pocket, overhead preliminary proofer. Travel through this unit takes 10 min.

Finally, the dough is automatically molded into the vari-shaped rolls—frankfurter, hamburger, or dinner—and loaded into pans, proofed, and baked.

Water rolls are made by a company-designed unit. This machine conveys the dough pieces under a rotating wooden wheel that simultaneously applies melted butter as it creases the center of each roll.

Now for production details on sweet rolls, like cinnamon and pecan:

Dough is prepared in the three Artofex mixers, fermented, proofed, scaled into 8-lb. pieces, and loaded into trays that go into proof boxes. Following proofing is the dough-break operation. After the dough is formed into sheets, the filling or sugar-spice mix is topped on each sheet. The sheets of dough are then either curled by an aluminum corrugated roll or folded by hand to get two layers of filling and three layers of dough. Folded or curled dough is machine-cut into various sizes.

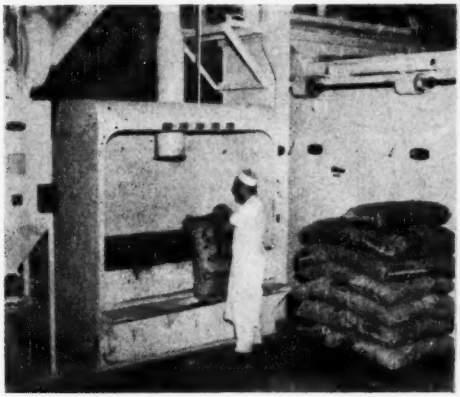
Benchmen then form the dough pieces into the rings and other shapes. Rolls are finally placed in greased pans, topped with nuts or spice-mix, proofed 30 to 35 min., and loaded into a traveling-tray oven.

Production of Danish pastry is slightly different. Here, the dough by-passes the fermentation room and goes to a divider that scales it into 15-lb. pieces. Dough pieces are then fed to the make-up line, where a canvas-belt conveyor carries them through two sets of rolls. Sheeted dough is next loaded onto trays and moved into a refrigerated room for 1 hr. of chilling. Butter is then rolled into the dough four times.

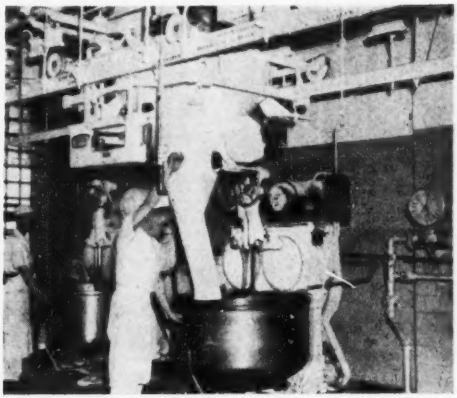
Following a 6-hr. rest, the dough is formed by night crew into the different shapes. Dough is then put into pans, proofed 30 to 40 min., and baked. In the finishing department, girls apply icing or topping to the cooled pastry.

Here's how layer cakes are made: Ingredients are scaled in special containers and chilled in a refrigerated room. Next, the ingredients go into two 700-lb. capacity horizontal mixers. Batches of cake batter are then dumped into metal troughs having eye bolts on both ends. An electric hoist lifts the trough, which is then moved on a monorail to depositor.

Modern Bakery Department Is Geared to Produce Many Items

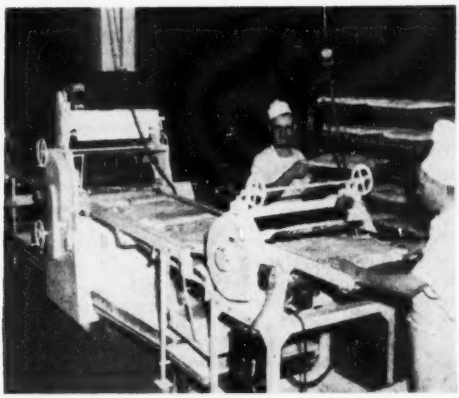


INTO BLENDER (center) go bags of flour. Then blended flour is bucket- and screw-conveyed to storage bins (right).



SCALE HOPPER, mounted on overhead rails, automatically weighs sifted flour into mixers. Water is metered.

PANS of cookies are taken out of traveling tray-type oven and loaded into racks, then packed in fancy boxes.

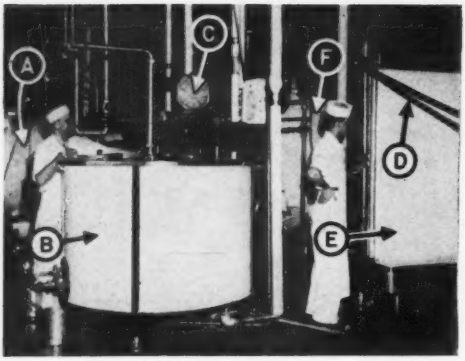


IN MAKING sweet rolls, this unit forms dough into sheet. Filling or spice is added, then dough is shaped into rolls.

WEDDING CAKES get special attention. Almond paste is placed on two layers, tiers centered, and cake decorated.

SPECIAL-ORDER CAKES are tube-decorated by girls specially selected for their art-school background.

Camera Visit to Ice Cream and Fountain Syrup Departments



MAKING ICE CREAM (left photo). From storage tanks (A), cream and condensed milk go to make-up tank (B), into which liquid sugar and corn syrup are metered (C). Ingredients are mixed and pasteurized. After mix is homogenized, pipe (D) carries it to cooler (E). Then mix is fed into holding tank (F), ready to be frozen and then packaged. Hot fudge for topping sundaes (right photo) is prepared in steam-jacketed kettle, filled in 20-lb. metal tins.

Batter is dumped into the hopper of the machine that deposits it into greased pans. The pans of batter are next loaded into a traveling tray oven. After cakes are baked 22 to 25 min., they are cooled on racks for 1 hr. and then dumped onto a canvas-belt conveyor, where girls spread filling between two layers and apply icing.

Decorating Special Cakes

Top efficiency in the manufacture of special-order birthday and wedding cakes is exemplified in the cake-decorating department. During Christmas week, for instance, a staff of 30 girls turns out more than 10,000 such items. To do this decorating work, Sanders hires only girls with art-school training. These girls handle each order individually, brush-painting portraits, holiday scenes, or other special features, and tube-forming flowers and letterings on boiled fondant-covered cakes.

Seasonal cakes, like those for New Year's, Valentine's, Mother's, and Father's Day, are made on a straight-line production basis. Layers are centered ahead of time by the regular bakery department crew. Cakes are removed from cooling racks and depanned on a canvas-belt conveyor. Next, girls spread filling over the layers with a spatula, center two layers with filling between them, apply a base icing to the cakes, and sprinkle crushed nuts along the sides. Then, the layer cakes are loaded onto racks, which are then transported to the decorating department.

Prepared ahead of time for the decorating crew are small flowers and butter-cream icings containing U. S. certified vegetable colors. Flowers are made on special decorating nails, with royal-type icing used because it hardens sufficiently for easy handling.

Wedding cakes get special attention —a thin sheet of almond paste goes over each two-layer tier before frosting is applied. Reason: To retain the moisture and original eating qualities.

There are two principal steps in making wedding cakes—preparing the tiers and decorating. Forming different size tiers is done by spreading filling between two layers, which are then coated with a pure butter-cream icing. Over each tier next goes the thin sheet of almond paste and fondant icing.

Tiers are now centered, with the largest on the bottom and smallest on top. Finally there's the art-work—tube-decorating the two to six-tier cakes with royal icing.

Preparing Ice Cream

Use of modern, sanitary, equipment highlights production in the ice cream and fountain-syrup department. Ice cream produced last year by Sanders amounted to 650,000 gal.

Making ice cream begins following transport of heavy cream to the plant in 10-gal. cans, which are drained six cans at a time in a 60-gal. capacity stainless steel dump tank. From here, cream is pumped into two 1,000-gal. glass-lined holding tanks. Condensed milk (28 percent solids) is also trucked to the plant in 10-gal. cans, which are drained into the dump tank. The milk is then pumped into two 600-gal. glass-lined tanks.

Liquid sugar is hauled in by tank cars and pumped into six 10,000-gal. storage tanks. Also, corn syrup is tank-car delivered and pumped into two 15,000-gal. steam coil-fitted holding tanks.

The job of adding raw materials into two 300-gal. mix make-up tanks has been simplified. Now cream and condensed milk are float-gaged, rather than weighed. Liquid sugar and corn syrup, on the other hand, are metered into the stainless steel, steam-jacketed mixing tanks. All ingredients are then pasteurized at 160 deg. F. for 30 min. and blended, at the same time, with propeller-type mixers. Both mixing tanks are equipped with temperature recorders.

From the make-up tanks, 400 gpm. of the pasteurized ice cream mix is pumped through a Gaulin homogenizer, operating under 2,500 psi. Purpose of running the mix through this unit is to break-up the butterfat and other solids, and thus produce a smooth-textured, non-separating ice cream.

Leaving the homogenizer, the mix then goes through a stainless steel Mojonnier cooler at the rate of 400 gpm. Here, temperature of the mix is lowered from 160 to 32 deg. F. as it passes over water- and ammonia-refrigerated coils. Next, the mix is pumped into four refrigerated, glass-lined holding tanks—two of 1,000-gal. capacity, two of 600-gal. capacity.

Flavors are prepared in small stainless steel tanks and then added to the ice cream mixes immediately before they enter four continuous Vogt freezers, which are equipped with ammonia-refrigerated cylinder and rotary scraper blades. The mixes are chilled to 21 deg. F. as they flow at 150 gpm. through the freezers.

Multiple Packages

Flexibility keynotes operations on the packaging line, where bulk and packaged ice cream, as well as frozen

confections, are put up. In packing 5-gal. cans of ice cream, a spring-operated filler is lowered into the bottom of each container, and as the product flows into the can, the filler automatically rises until filling is completed. Then a cover is applied to the can as it is conveyed to an 18-deg. F. hardening room for 24 to 48 hr. of storage.

Pints are filled at the rate of 2,400 per hr. by an automatic Anderson machine, which sets up the cartons, fills them volumetrically, and then closes the flaps. Another Anderson machine fills 4-oz. paper cups at the rate of 50 per min.

Prepackaged ice cream cones are also machine-filled. Conical paper cups are manually placed in aluminum holding racks—20 cups to a rack—and sugar cones are inserted into each cup. Racks are then placed on a conveyor and carried under a two-spout cone-filling machine. After cones are filled, they are topped with a paper disk.

Packaged pints, cups, and cones are conveyed through the hardening room. Travel through the room takes about 1 hr. Packages then go into shipping cases, which are held in the hardening room, ready for delivery to the company's stores.

Preparation of special-order ice cream in fancy molds calls for a four-step operation. First, the ice cream is scooped from 5-gal. cans in dispensing cabinets and packed into vari-shaped metal forms. Then the forms are placed in a dry-ice refrigerated cabinet, where the molded cream is hard-frozen in 10 to 20 min. Next, the forms are immersed in running cold water to remove the molded ice cream. Finally, the product is packed in cartons that are dry-ice refrigerated while being delivered to the homes.

Preparing Fountain Syrups

In making soda-fountain syrups, simple syrup (32 deg. Brix) is first heated to 190 deg. F. and then cooled to 80 deg. F. in a stainless steel, steam-jacketed, 110-gal. kettle. From here, the syrup is pumped to seven 60-gal. stainless steel holding tanks. In six tanks, strawberry, cherry, raspberry, pineapple, vanilla and chocolate syrups are prepared—color, flavor, and fruit acid being added and mixed.

Girls fill the flavored syrups into 1-qt. cans loaded twelve to a metal tray. Filling from holding tanks is through a spout with a lever-operated, quick-opening valve. Measured amounts of crushed fruit are then added to each can before the cover is put on.

From the seventh holding tank, basic syrup is gravity-fed into two 20-gal. stainless steel tanks in which lemon, orange, maple, or root beer syrups are prepared. These syrups are also filled into 1-qt. cans.

Hot fudge topping for ice cream sundaes is made up in a 150-gal. stainless steel, steam-jacketed kettle, equipped with a hinged-paddle agitator. Corn syrup is metered into the kettle and measured amounts of cream and sugar are added. The ingredients are mixed as they are heated to 240 deg. F. Milk chocolate is then introduced and more cream is added until the proper consistency is obtained. Finally, the fudge topping is filled into 20-lb. metal cans, ready for delivery to stores.

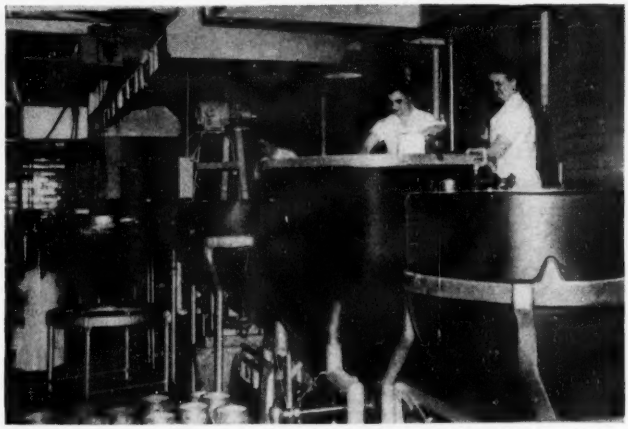
About the Commissary

Prepared on a volume-production basis in the commissary department are the Sanders' soups, salads, sandwiches, casserole dishes, and special plate lunches. Last year, production of these products totaled 7,575,000 lb.

Soups are cooked in a 300-gal. stainless steel, steam-jacketed kettle, and then filled through a spout, via lever-operated, quick-opening valve, into 5-gal. aluminum cans. Typical soups are chicken, turkey, mulligatawny, mushroom, cabbage, celery, browned potato, and clam chowder.

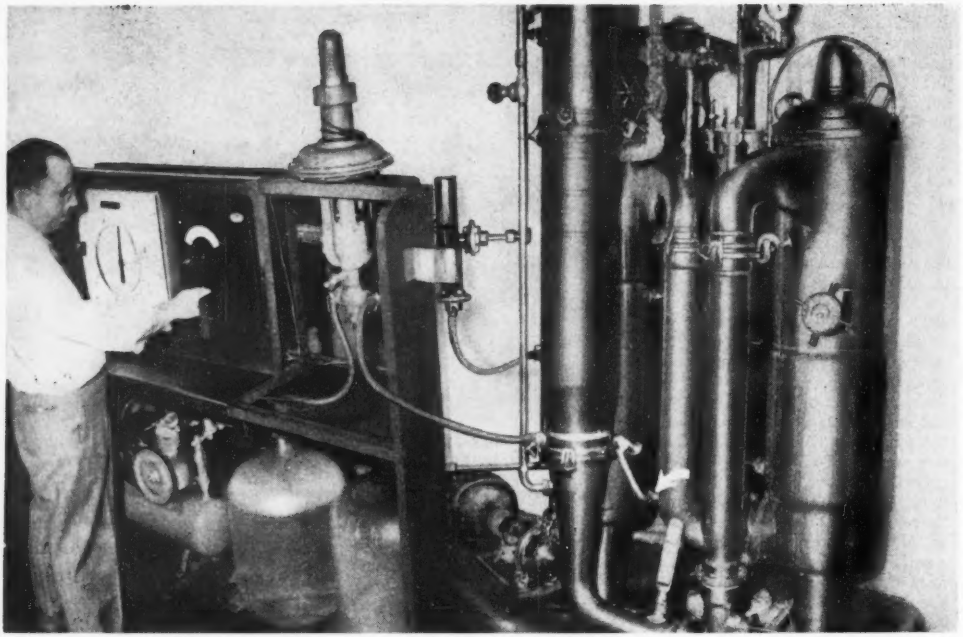
Beef, veal, and lamb stews, as well as turkey for sandwiches and barbecued beef, are cooked in four 250-gal. stainless steel steam-jacketed kettles. Stews are filled into 5-gal. cans. Cream and cheese sauces, gravies, and boiled salad dressing are processed in a 300-gal. kettle that is equipped with a hinged-paddle agitator.

(*Turn to page* 153)



COOKED in stainless steel kettles (right) are soups, stews, sauces, and gravies. At left, water is drained from spaghetti in hoist-handled colander.

WRAPPING SANDWICHES. On each table, two girls prepare the sandwiches and a third one wraps them. Other girls load trays of sandwiches on racks.



INVENTOR ROBICHAUX checks control instruments on his continuous neutralizer. Unit comprises control panel (left), flow-type pH controller (clamped to panel), and flexible caustic feed line attached to pasteurizer at right (arrow).

Newly Developed Unit

CHECKS pH RIGHT ON LINE

Acidity of cream continuously tabbed, neutralizer added as needed. Benefits are improved product, speedier operation

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

Many food processors have dealt too loosely with product acidity.

The fact is that it has a very great influence on quality. And there is no doubt that successful in-plant standardization of pH should be a major processing technic.

But methods of standardizing pH have been, of necessity, so cumbersome that this phase of quality control has lagged behind the many other recent advances in food engineering.

Consider the painstaking way many dairy products are neutralized. Involved is a detailed series of measurements and adjustments—end object being a desired batch acidity before further processing. Still, even the most carefully followed program of this type rarely achieves the exact pH for which it aims.

Postwar improvements in pH measuring devices suggested a tool to eliminate batch standardizing. Experimental use of such equipment on cream, and development of a novel technic of adding reagents under vacuum, have led to the invention of a new method of continuous standardization that appears to have wide possibilities throughout food processing.

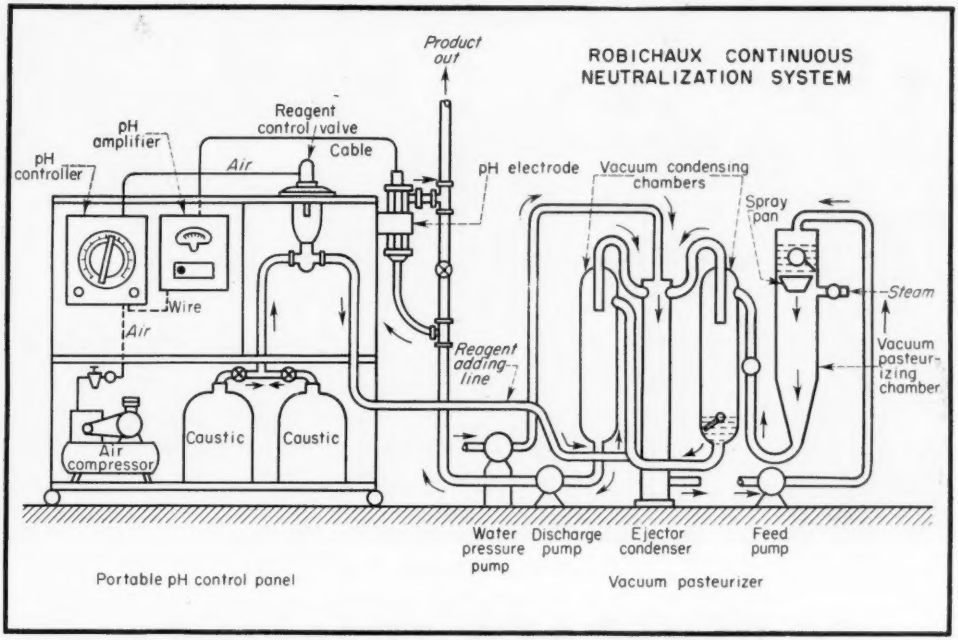
Today, after several months commercial use in cream processing, this new technic has proven its ability to—

- **Eliminate delay between incoming product and further processing.**
- **Provide fixed pH in all goods, averting batch-to-batch deviations.**
- **Prevent saponification and reagent flavors by instant reaction.**
- **Remove calculation and work involved in preparing batch lots of neutralizer.**
- **Produce an improved flavor and viscosity in finished products.**

Old Way Provokes Change

The idea of the new method and system of continuous standardization first came to Roy Robichaux several years ago while he was managing a creamery in the Midwest. It was stimulated by the unsatisfying, erratic results obtained with conventional methods. Why couldn't large errors of the batch system be trimmed by continuously measuring and adjusting

And the "Inside Story"



IN OPERATION, acidity of pasteurized cream is determined continuously by pH electrode. Then pH controller actuates reagent control valve, which dispatches required amount of caustic to high vacuum chamber of pasteurizer.

smaller product quantities—and eventually uninterrupted flows?

In former practice, adjusting cream to an acid number or percent required sampling and testing in batches. Once a laboratory acid check was made, the procedure was as follows:

1. Weight of batch was taken.
2. Amount of neutralizer required was calculated.
3. Neutralizer was weighed precisely, dissolved in water, and sprayed into agitated batch.
4. Acidity was re-checked after further processing.
5. Steps 1 to 3 were repeated, if necessary.

Despite all precautions, it was generally necessary to carry out that irksome fifth step of the program.

Another costly disadvantage of batch neutralization was its slow-up of product movement. Processing could not occur until a batch was accumulated, tested, and neutralized. In subsequent operations it was thus necessary to work from batch to batch.

Batch methods also introduced a quality problem. When the acid-reducing medium was added there was always a risk of local over-neutralization before the complete reaction took

(*Turn to page* 155)

"Gains beyond expectations"

Six months' use of the new equipment in Robichaux's Brodhead, Wis., Goldenrod Creamery has disclosed process gains beyond expectation.

The installation has not only eliminated the chore and errors of batch standardization, but it has also provided notable quality improvement.

And increased overall process efficiency—substantially reducing time and costs—has already compensated in this short period for the outlay made on equipment.

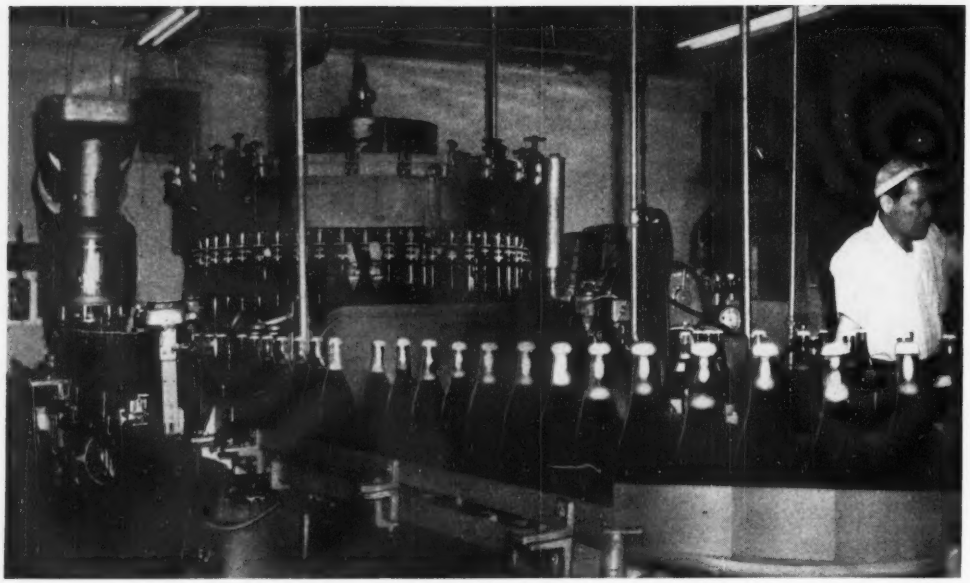
Now it isn't necessary to wait for a batch before the start of processing. And delays due to improper, neutralizing and re-neutralizing have been eliminated. As a result, all equipment runs continuously and the plant's throughput has been almost doubled.

Robichaux's product displays a vast improvement in uniformity. Continuous pH adjustment has narrowed product acidity to within 0.2 pH—giving goods a dependable flavor and viscosity. A recent carload of butter brought specific compliments for uniformity of the churnings.

Cream for byproduct use is enhanced by the new system. Several thousand pounds of factory sweet cream were recently processed for ice cream mix manufacturers. Acidity of this cream—.12 to .20 before processing—was continuously standardized to 6.5 pH. Although fat content ran from 36 to 45 percent, there was very little noticeable difference in viscosity. And no user criticized the quality.

Still other quality advantages have appeared through the new technic. For example, it was found that fat loss in buttermilk is substantially lowered. Further, practically all products evidence better flavor.

Perhaps the most important contribution of the system is its possibilities for further accelerating food engineering progress. For it provides yet another instrumentized tool to bring food quality into the realms of sound engineering.



"THE BOTTLED PRODUCTS' consistency and desirable taste is largely determined by adequate controls."

BEVERAGE QUALITY

And How to Assure It

Selecting superior flavors, carefully treating and deaerating water, and eliminating spoilage microorganisms are most important factors

S. S. EPSTEIN

Vice-President and Chemist,
Kirsh's Beverages, Inc., Brooklyn, N. Y.

Factors instrumental in stamping the characteristic of quality on any product include production, advertising, selling and distribution.

But lacking careful and controlled production methods, no degree of superlative advertising, selling and distribution can establish a market for a product which obviously cannot possess quality distinction.

In the case of carbonated beverages, the mark of quality depends upon taste and shelf life. The bottled products' consistency and desirable taste is largely determined by adequate controls over plant production methods. Components essential to the taste character are: (1) Flavoring ingredients, (2) sugar, (3) acid, (4) water, and (5) carbonation.

Only a very few of the 6,500 soft drink bottling plants operating in the United States manufacture their own flavors. Most of them purchase materials from firms that specialize in the extraction of flavoring ingredients from fruits, berries and vegetable products, and in compounding and blending essential flavor oils and compounds. The experience of the bottler has been very favorable in his dependence upon the flavor specialist to provide him with this important component of carbonated beverages.

Taste-Testing Technics

To compare two similar flavoring extracts it is advisable to prepare bottled drink samples under plant conditions wherein all other factors are constant. Employing the triple comparison procedure is considered reliable for obtaining an index as to the preferred flavor compound.

In this procedure, two identical samples and one that is different are judged by one individual at one sitting. He is asked to answer the following questions: (1) Which one of the three samples is preferred? (2) Which one is poorest in taste? (3) Which characteristics of the preferred drink are pronounced—(a) lasting flavor, (b) sweetness, (c) tartness, (d) carbonation? If he fails to closely identify the like samples the judgment is not considered.

Plant Panels Possible

The value of such tests obviously depends upon the number in the panel. In many instances judges can be found among the personnel of the plant and office. Since experience has shown that most people have special sensitivities to one or two flavors and not to others, classifying such individuals according to their flavor sensitivities provides a means of selecting a competent panel as a source of taste opinion.

When comparing more than two samples of similar flavoring compounds, taste opinions can be approximated by submitting a set of three different samples at one time. The taster is asked to give a rating of 5 to the preferred drink and ratings of 4, 3, 2 or 1 to each of the other two. The one receiving the highest accumulative rating is then used as a standard for evaluation of two other similarly flavored samples. In this manner two superior flavors can be selected for a final taste test in which the triplicate comparison procedure is applied.

Variables Affect Flavor

The same flavoring compounds will not always render like tastes in the finished, bottled product manufactured in different plants. Reasons for these variations may be few or many. Fundamentally, the taste of a beverage is dependent upon the appropriate balance of sugar, flavoring ingredients and carbonation. In fruit and cola flavors the amount and kind of acid must be added to the equation. Still another component that affects taste reaction is color for although it does not react with taste buds, the psychological influence on taste consciousness is appreciable.

The quantities of flavoring ingredients, sugar, acid and color for various flavored carbonated beverages have been satisfactorily established by manufacturers of flavoring extracts. Intelligent application of directions assures desirable results.

Degree and amount of carbonation has also been well established. To acquire and maintain the proper carbonation depends not only upon correct mechanical operation of saturators and fillers, and frequent gage tests, but also upon the character of the water used in bottling.

Influence of Water

Most municipal waters, although palatable and safe, are not suitable for bottling carbonated beverages. Public health authorities apply limits of tolerance regarding turbidity, taste, color, bacteria content, and degree of hardness to assure potable and healthful drinking water. To produce an acceptable carbonated flavored beverage, however, the bottler must further treat municipal water so as to obtain a higher degree of purity.

Turbidity and organic matter in many potable waters may be of an amount to cause excessive foaming in filling with ultimate loss of gas and consequent deleterious effect on flavoring materials.

Excess hardness and alkalinity will produce undesirable flavor tastes through reaction with the acid in the beverage. On occasion, excess alkaline salts in water may cause deposits in a bottle.

Minute quantities of salts of iron, copper and manganese are harmful to flavors and may also cause undesirable sedimentation.

Therefore, it is obvious that the production of a good tasting carbonated beverage requires special treatment of water used. The subject of adequate water treatment is complicated and is of sufficient importance to warrant special considerations. However, mention can be made of the fact that progressive bottling plants have suitable sand filters to remove suspended matter, and also activated carbon filters to remove residual chlorine as well as substances causing foreign tastes. When required, such bottlers also remove excess alkaline salts and convey the water to finer filtration after treatment with activated carbon.

Dissolved Air Important

A character of water which may have an appreciable influence on beverage flavor is the air content. It is well recognized among brewing technologists that excess air causes undesirable changes due to actual oxidation of beer constituents. And this deleterious effect increases with age of the beer[1]. Because of low solubility of air in water, excess amounts will interfere with proper carbonation, and will undoubtedly cause poor gas retention, once the crown is removed from a bottle.

Excess air may also provide oxygen in an amount that will cause changes of many flavoring ingredients, particularly easily-oxidizable phenolic compounds such as vanillin and terpene compounds present in citrus flavors.

Recently, employment of an improved manometric technic[2] showed that an uptake of 1.2 milliliters of oxygen per gram of orange oil was sufficient to produce definite terpeney aromas in every case of experimentation. Studies to determine limits of air tolerance with respect to possible undesirable flavor changes in carbonated beverages are certainly well warranted.

TABLE I—STERILIZING ACTION of Caustic on Composite Yeast Growths Is Influenced by Contact Time and Temperature

Temperature, Deg. F.	Caustic, Percent	Percentage Killed After 1 Min.	3 Min.	5 Min.
110	2.0	<90	<90	99+
120	2.0	<90	99+	100
130	1.5	90+	99+	100
130	2.0	100	100	100

< Less than.

TABLE II—TO OBTAIN STERILE BOTTLES, Temperature and/or Caustic Content of Soaking Solution Must Be Increased As Time of Soak in Washing Unit Is Decreased. (From Chicago Health Regulation, Dec. 1, 1950.)

Holding Time Min.	Temperatures, Deg. F. 110	120	130	140	150	160
	Concentration of NaOH (Percent)					
1	11.8	7.9	5.3	3.5	2.4	1.6
3	6.4	4.3	2.9	1.9	1.3	0.9
5	4.8	3.2	2.16	1.4	1.0	0.6

TABLE III—DESTRUCTION of Air-Borne Microorganisms by Ultraviolet Radiation Depends Upon Lamp's Age. (Exposure Distance 4 In. From Lamp. Results Given In Percent.)

Exposure Time	Numbers of Yeasts Exposed 48 to 240 New Lamp	48 to 240 Used Lamp*	2,000 to 10,000 New Lamp	2,000 to 10,000 Used Lamp*	Numbers of Bacteria Exposed 11 to 70 New Lamp	11 to 70 Used Lamp*	1,000 to 8,000 New Lamp	1,000 to 8,000 Used Lamp*
30 sec	100	87	99.7	<90.0	100	88.6	99.7	<87.0
1 min	100	92	99.9	<90.0	100	99.8	99.8	<87.0
2 min	100	100	99.9	99.7	100	100.0	100.0	99.8
3 min	100	100	100.0	99.9	100	100.0	100.0	100.0
4 min	100	100	100.0	100.0	100	100.0	100.0	100.0
5 min	100	100	100.0	100.0	100	100.0	100.0	100.0

* Lamp in practical use for about 2,200 hr.

< Less than.

From the biological standpoint it is known that the growth of spoilage microorganisms is stimulated by the presence of air. As in the chemical processes, so it is true in the biological processes that only the oxygen constituent of air is involved. Atmospheric air is essentially composed of 79 percent nitrogen and 21 percent oxygen. Air dissolved in water is composed of about 66 parts nitrogen and about 34 parts of oxygen. Thus, dissolved air is much richer in oxygen than atmospheric air and, therefore, the corresponding influence on microbial growth is correspondingly greater than ordinarily calculated.

Microorganisms Detrimental

By far, the agents most destructive to flavor and taste of carbonated beverages are spoilage microorganisms. Such agents can also cause changes in appearance due to turbidity or sedimentation, or both. The sugar content of beverages is the most inviting to the growth of microbes. Sugar happens to be a source of energy to all forms of life, from microscopic plants to humans. To produce and maintain an acceptable and desirable carbonated beverage, the bottler must have a clean and sanitary plant.

A recent report[5] disclosed that alkyldimethyl-benzyl-ammonium chloride, in a concentration of 1-5,000, may satisfactorily replace chlorine in the sanitization of pipe lines and syrupers in the bottling plant. It is very likely that a good quaternary compound can be used to sanitize removed parts of equipment, also. However, experimental and practical evidence is not sufficient at this time to suggest that such solutions are as effective as chlorine for sanitizing sprays. The advantage of quaternary solutions over chlorine is that they are non-corrosive and practically odorless.

For sterilizing with caustic, the American Bottlers of Carbonated Beverages recommends a contact period of 5 min. in a 3 percent alkali solution (of which at least 60 percent is caustic) at 130 deg. F. The factors —time of contact, strength of alkali and caustic, and temperature—were determined after careful surveys of equipment in the industry and after repeated caustic sterilization tests on dried yeast spores[4]. The recommended alkali solution was calculated to have the equivalent germicidal strength of a 2.25 percent caustic solution that effected complete sterilization within 5 min. at 130 deg. F.

Our own investigations included eleven observations of the sterilizing powers of plant-machine caustic solutions against composite old-agar cultures of yeasts[5]. Results are summarized in Table I.

On the basis of our findings it seems that the conditions proposed by ABCB should adequately sterilize bottles for carbonated beverages. Conditions should be maintained at all times, with checkups by alkali and caustic tests at least once a day and hourly temperature observations.

Regulations prescribed by the City of Chicago, as of Dec. 1, 1950, incorporated the recommendations of ABCB for bottle washing and added other specifications to be met when bottle washing devices are geared for soaking for less than 5 min., and where the temperature of the soaker solution is thermostatically controlled at a point above 130 deg. F. Conditions of time, temperature and caustic content are shown in Table II.

Ultraviolet Radiation Helpful

In the soft drink industry ultraviolet lamps have been advantageously used in syrup tanks, over washed bottle conveyors and capping machines, and for the treatment of bottling and rinse water. Where syrup is stored in tanks, lamps are placed under the covers and spaced so as to allow 1 in. of lamp for about 5 sq. ft. of surface area. These installations have reduced growth in the syrups of air-borne bacteria, yeasts and molds.

For application to bottle conveyors, lamps are placed in hoods so that they are about 4 in. above the tops of the bottles. The hoods are brought down far enough to confine radiation to the conveyor.

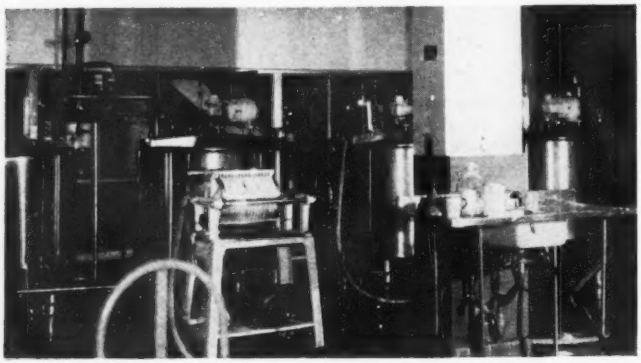
For use on capping machines the lamps are placed above the crown hopper. This procedure is intended to maintain the sanitary condition of the crowns within the hopper and possibly to reduce bacteria on the surfaces of crowns directly exposed to the radiation.

Tests of ultraviolet radiation at a distance of 4 in. from a new conveyor lamp showed that over 86 percent of air borne microorganisms deposited on malt-extract agar were destroyed within a period of 30 sec.[5] Tests with a lamp that had been in use for about 2,200 hr. showed a destruction of 67 percent of microorganisms exposed to its rays.

Several Factors Involved

In other tests, dried droplets of saline suspensions of malt-extract agar cultures were deposited on the interior surface of sterile Petri plates. The contaminated areas were exposed to the same pair of lamps at a distance of 4 in. for 30 sec., 1, 2, 3, 4 and 5 min. Results, summarized in Table III, further confirm the value of ultraviolet light radiation as an aid in plant sanitation. As can be seen, the degree of destruction varies with the numbers of microorganisms exposed and also with the age of the lamps.

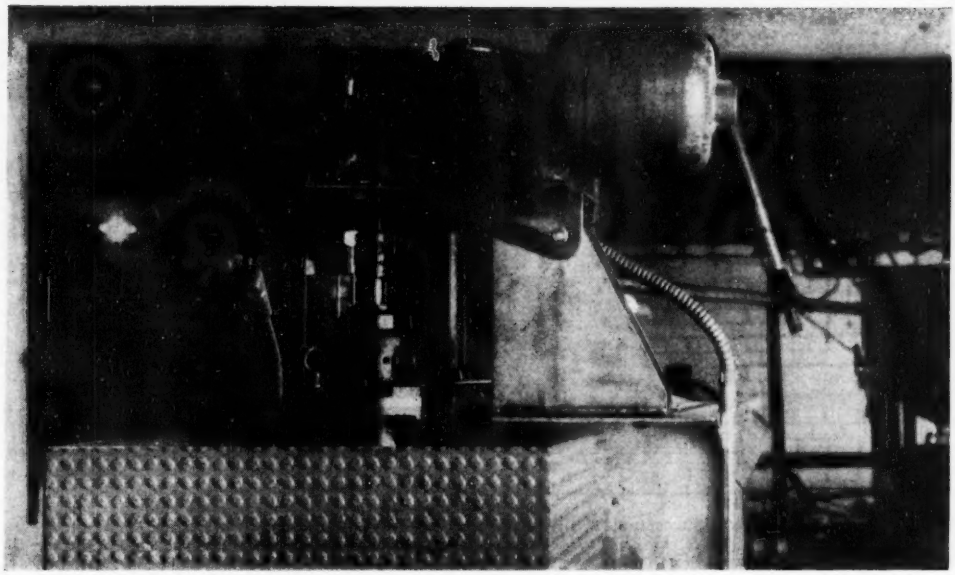
It will be noted that, with new lamps, complete destructions of both yeasts and bacteria took place within 30 sec. when the numbers of microorganisms exposed were less than 240 and 70, respectively. With numbers of microorganisms in excess of 2,000, an exposure of 3 min. was required to accomplish complete sterilization. The loss of sterilizing powers of ultraviolet lamps after usage is well indicated in these test results.



SOFT DRINK QUALITY begins in the syrup room. Here, syrups are made up and sterilized, then filtered, flavored and piped to the filling room.

References and Bibliography

1. P. P. Gray, I. Stone, and L. Atkin. *Wallerstein Lab. Comm.* 10, 183, 1947.
2. J. W. Keterson and R. Hendrickson, *Food Technology*, 5, 6, 222, 1951.
3. S. S. Epstein, FOOD INDUSTRIES, Dec. 1948.
4. M. Levine, ABCB Conv. Chicago, Oct. 20, 1936.
5. S. S. Epstein, *Wallerstein Lab. Comm.* 9, 195, 1946.
6. Sections 148 and 148A of the Sanitary Code of the City of New York, Oct. 1942.



KEY CONTROL is this Reich-designed discharge valve that dispenses liquids and solids uniformly.

Besides Cutting Labor Costs—

Mechanized Continuous Process Pays Six Extra Benefits

Precise Reich method employs controls that take guess out of jam, jelly, marmalade and preserve production. Makes uniform high-quality products non-stop at one-fourth batch labor cost

IVAN C. MILLER
Assistant Editor, "Food Engineering"

Continuous processing may be termed practical and profitable if it accomplishes just one objective—that is, reduces labor cost per unit of product.

Thus, strides beyond that may be counted as "all free and clear"—as is the case with the Reich continuous preserving process, which in several plants has not only cut labor costs approximately 75 percent over batch methods but has also contributed these six notable extras:

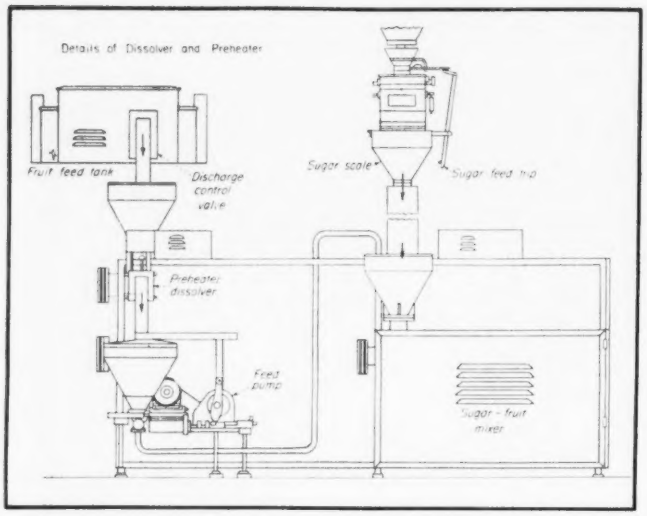
- **Prepares jam, jelly, marmalade and preserves non-stop in the same equipment.**
- **Requires only clean-up time for changeover.**
- **Turns out products of unvarying uniformity.**
- **Prevents waste of ingredients.**
- **Reduces floor space requirements.**
- **Minimizes the possibility of human errors.**

Operating Steps

—of labor saving Reich continuous jam, jelly, marmalade and preserve process is shown in graphic detail in this month's special FE Foldout Picture-Flowsheet. Turn to pages 134-137, where you will find each operation diagrammed, with close-up photos of key points.

Here, fresh fruits in season can be processed directly into one of the end-products, or sharp frozen and held for post-season use. Preparation is in the usual manner. Incoming fruit is conveyed to preliminary inspection tables, washed, trimmed, capped, stemmed or cut (as the product may require), and then either processed immediately or sugared for sharp freezing.

If jelly or jam is to be processed, fruit is first cooked in jacketed kettles. Cooking softens the fruit, simplifying the removal of seeds and skins in the pulpers.



PREHEATER-DISSOLVER is multi-controlled. Reich valve on fruit dump regulates flow to preheater where, in jacketed tubes, there is double-pass travel of product through heater. From preheater, proportioning pump delivers hot fruit to sugar mixer. Each stroke of the positive displacement pump trips sugar scale, admitting exact amount to mixer. Combined fruit and sugar then enter dissolver tubes (below preheater tubes) for similar double-pass journey through unit to a measuring pump supplying evaporator. Temperature in all sections of unit are maintained, by instrumentation, at 140 deg. F. As an over-all control measure, processing operations are automatically halted when high-low level instruments detect a break in rate of flow.

Juice from the pulpers is standardized in 2,000-gal. stainless steel tanks (agitated from the side), and is then ready to be made into jelly or jam.

These last three steps—cooking, pulping and standardizing—are bypassed when marmalade or preserves are to be run. Instead, the prepared fruit, either fresh or frozen, enters directly into the major processing units from a 200-gal. stainless steel thawing-dispensing tank. Uniform flow from this tank is made possible through employment of a specially designed discharge-control valve.

How Continuous Process Operates

Converting prepared fruits or juices into finished products is accomplished in three compact units of equipment, with two processing steps taking place in each. This combining of operations saves floor space.

Actual floor space occupied by each of the three units is approximately 50 sq. ft. The whole production line, affording 120,000 lb. per hr. capacity, requires only 45 ft. by 20 ft.—a compactness having advantages other than space saving. Clean-up time is minimized. And supervision is confined to a small and accessible area.

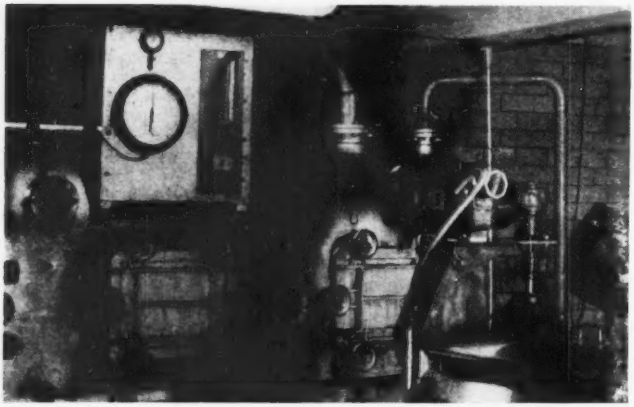
Sugar Dissolving and Juice Preheating

In the first unit, fruit is heated to 140 deg. F., after which it is mixed with sugar in a separate section. Combined fruit and sugar are then conveyed through the last section, where the sugar is dissolved.

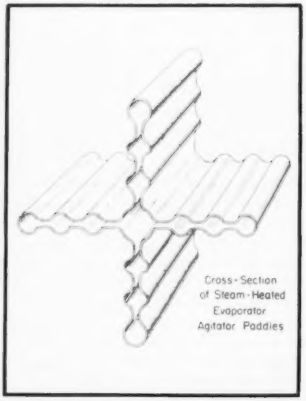
Sugar (either liquid or bulk) flows uniformly to the fruit and sugar mixer, while fruit or juice is continuously supplied to the preheater. Liquid sugar is added by meter or positive displacement pump; bulk sugar by weight. The latter flows by gravity from a high-low level controlled hopper to an automatic net weigher for measurement into the system.

During preheating, the fruit travels the length of the unit in one jacketed stainless tube, and returns in another, gently agitated in both by ribbon-flight screw conveyors. Dissolver tubes, located below preheater tubes, are similar in construction and employ the same type of agitation.

Controlled by the discharge valve on the dump tank, fruit is delivered to the preheater in exact amount. Speed of the motor-driven valve is synchronized with automatic level controls, the motor going faster as the level in the tank goes lower. By this combination of controls, the amount of product delivered to the preheater is always the same for any setting of the valve. Also, the



VACUUM EVAPORATOR provides rapid heat transfer to products through use of dual steam-jacketed troughs, in which steam-heated agitators rotate.



DETAILS of corrugated fruit-submerging agitator.

liquid-solids ratio is a true cross-section of product in dump tank.

Vacuum Evaporation

Temperature drops in the 500-gal. stainless vacuum pan to 125 deg. F., the drop occasioned by evaporation under 26 in. vacuum. Pectin solution, separately prepared in steam jacketed stainless tanks (propeller agitated), is added to the base in the evaporator by a proportioning pump.

Flow through this unit is through two steam-jacketed troughs. In both, the fruit is constantly submerged in the liquid portion of the base by horizontal rotating paddles. These are steam heated and corrugated. Smooth ridges on the paddles assure complete submersion of the fruit in the liquid without damaging the fruit. Keeping the fruit under the surface is necessary, not only to be certain of thorough impregnation with pectin, but also to prevent surface drying or crusting of the fruit solids.

Evaporation is controlled by temperature and pressure regulators. The all-over control of evaporation is obtained through employment of a density regulator. Thus instrumented, the evaporator delivers a product of unvarying brix-uniformity.

Inversion and Pasteurization

Pectinized base, of constant density, is now pumped from the evaporator into a 360-gal. inverter, where temperature is raised to 180 deg. F. This is optimum temperature for rapid sugar inversion, pasteurizing and viscosity reduction to an ideal jar-filling consisteney.

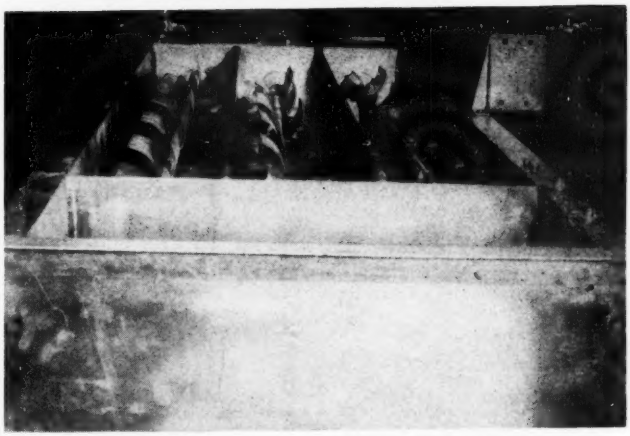
An acid (say, citric, lactic, or malic) is added to speed and control sugar inversion, being mixed with the base as it enters this unit. Actuated by pH control (0-8 pH), a measuring device delivers acid as necessary to produce the stipulated sugar inversion.

Quality of the final product, if it is a preserve or marmalade, is greatly dependent on thorough absorption of inverted sugar in the fruit solids. This is accomplished in a manner similar to that described for submerging fruit in the evaporator to assure pectin impregnation. However, the submerging horizontal paddles in the inverter (there are three of them) are not steam heated, nor are the paddle blades corrugated. Instead, they are curved and slotted to make finger-like tines.

When jam or jelly are made, the tine-like blade agitators are replaced by flat-blade agitators. These are designed to coagulate and collect albuminoids and scum. Changing agitators requires little time or effort.

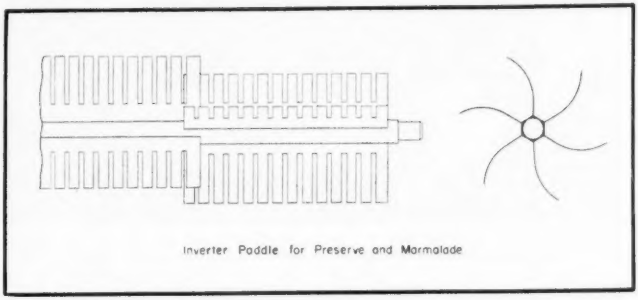
Top of the inversion tank is hinged to permit ready access to the agitators.

Inverter-Pasteurizer



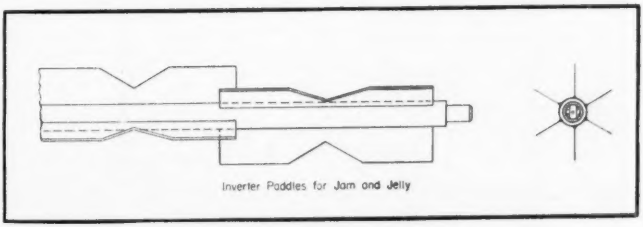
SUGAR INVERTER agitators are changed when switching from jam or jelly to marmalade or preserves. Design enables rapid replacement.

Uses Tined Blades for Preserves and Marmalades



Inverter Paddle for Preserve and Marmalade

. . . And Flat Blades for Jam and Jelly



Inverter Paddles for Jam and Jelly

Also, flight shafts are socketed so as to be readily detached and removed.

Compartments in the unit, in which these three horizontal mixers rotate, are steam heated to provide the temperature rise to 180 deg. F. Control instruments maintain the temperature within 1 deg. F. Inversion tank empties into an intermediate holding tank, also fabricated of stainless.

Quality of the preserve or marmalade demands more than care in proportioning, heating, evaporating, and inverting. For uniform dispensing of fruit solids in each jar of product is necessary if the strived-for quality is to be realized.

Second section of the inverter unit is designed to deliver to the filling machines, continuously, a true cross section of the product. This is possible through employment of a motor driven discharge-regulating valve from the holding tank. Whether the fruit

solids tend to float on top, or sink to the bottom, this Reich device delivers a flow of product, that has at all times the same proportion of fruit solids and liquid as the main body of preserves or marmalade in the holding tank. In short, solid-liquid ratio in each jar of product is uniform.

Processing Units Easily Cleaned

Because the process is continuous, the first unit can be cleaned while the second is emptying. This conserves running time (if not actual equipment-cleaning time) because cleaning may be started 45 min. before processing ends. All units are designed to be completely accessible for such maintenance. Only 10-15 min. cleaning time is needed for each.

When a change-over is made, it is only necessary to hose out the equipment. At the end of the day, each unit is washed with 80-lb. pressure hot water. After washing, steam is turned on in each unit for a few minutes for a thorough drying. Cleaning of all processing equipment takes no longer than 45 min.

Efficiency of this highly mechanized continuous process is due initially to the functional design of the units; secondly to the kind and extent of controlling instruments and devices. Control instruments include regulators and recorders of pressure (steam and vacuum), regulators and recorders of temperature, pH controller, density regulator, and high-low level controls.

Control devices include automatic metering and weighing units, proportioning pumps and discharge-regulating valves. Over-all control depends on an elaborate system of electrical switches, relays and lights. These are combined in one instrument panel.

How the Instruments Work

At the bottom of the control instrument panel are seven valves on steam lines. When processing starts, these are manually opened to admit steam to: 1. Dissolver, 2. preheater, 3. vacuum evaporator-pan jacket, 4. vacuum-pan agitator, 5. sugar inverter, and 6. intermediate holding-discharge tank. The seventh valve opens the main steam line.

On each steam line, beyond the hand valve, is an automatic regulating valve (see photo). Correct temperature is held on all processing units through operation of these controls.

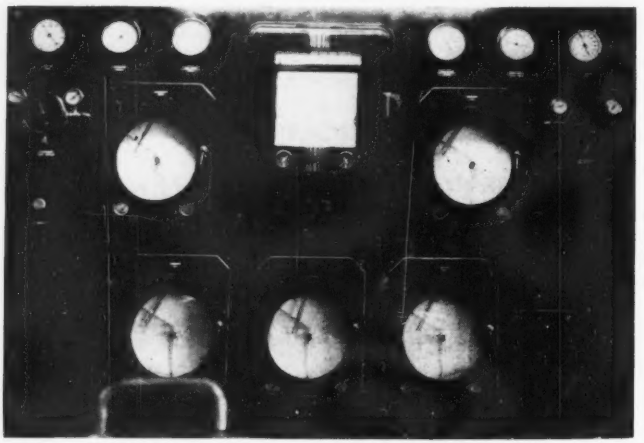
Evaporation is triple-controlled by pressure (vacuum), temperature, and density regulators. Sugar inversion is dual controlled. A temperature regulator controls the heat; a pH instrument the flow of acid.

Although the capacities of the units and their sections vary from 116 gal. to 500 gal., the rate of flow through the system is unvarying. Two independently controlled operations assure this constant, uniform flow. All ingredients are continuously measured into the system. Finished product is constantly measured out of it.

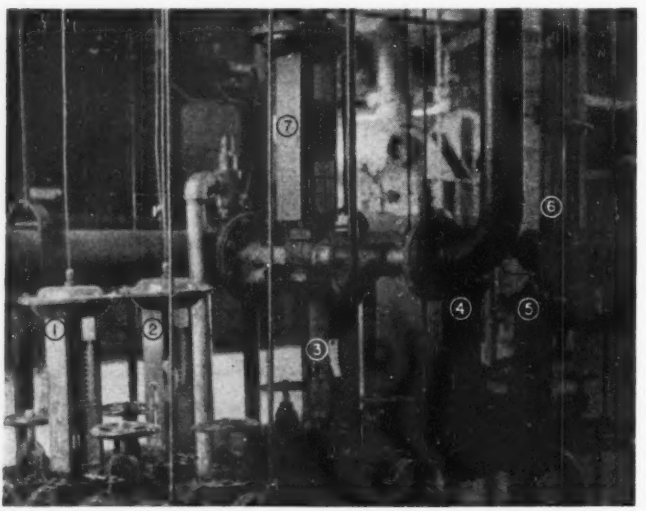
Meters, positive displacement pumps, and Reich regulating valves deliver uniform amounts of fruit and ingredients into the system. Should the rate of ingredient delivery or the rate of flow through the system be altered (due to some mechanical failure), high-low level controls, wired from each unit to the master electric control panel, report the changed rate of flow. Electric controls then close the master steam valve, stop motors and halt processing until the flow rate is adjusted.

If a motor burns out or blows a fuse, current to all motors on processing units, is interrupted and the main steam line shut off. Panel board lights warn of trouble and help to locate it. Action of this elaborate electrical control system assures that no product is spoiled during processing. And exact automatic proportioning means no ingredient is added in excess and wasted.

It is also because of extensive instrumentation, as well as continuous processing, that only negligable manual operations or supervision are necessary. This is why one mechanic and assistant can turn out 120,000 lb. of uniform high-quality products per day.

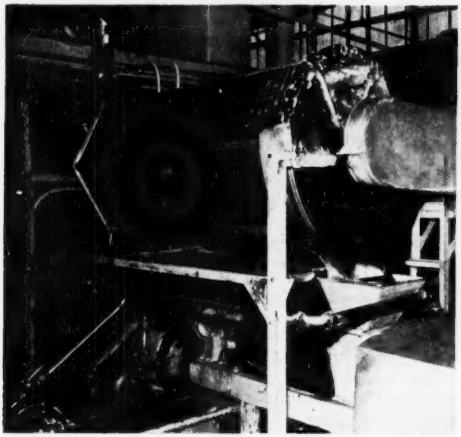


TEMPERATURES, pressures, pH and vacuum are indicated by instruments on panel. Included on board are seven manually operated steam valves.



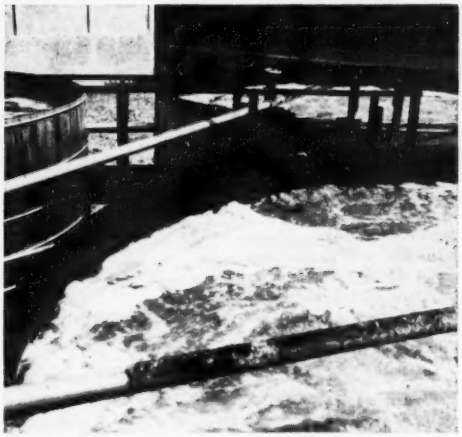
SIX AUTOMATIC UNITS (behind panel) regulate steam flow, thus control temperatures of processing operations. Seventh handles main steam line.

Screens separate solids



SEEDS AND PULP, removed from juice line by this stainless steel reel, are now diverted to feed processing.

and tanks do final job on liquid



LAST STEP in handling of waste water before discharge is violent aeration to destroy fermentable substances.

Solves Waste Problem; Saves Too

Citrus canner's progressive efforts eliminate disposal nuisances—and recovery of formerly-lost solids pays off in molasses, oil, and feed

C. E. WRIGHT
"Food Engineering" correspondent,
Jacksonville, Fla.

Solids lost in the handling of waste have been reduced to but .002 percent at the Dunedin, Fla., plant of the Juice Industries Division, Clinton Foods, Inc. In the daily handling of 800 tons of waste peel, only a mere 3,200 lb. of solids are now lost.

And the improved solids-saving methods have given the company new sources of revenue from such items as molasses, citrus oil, and feed.

The problem of waste disposal has been the subject of continuous study at the plant since 1940, with the exception of a mid-decade period when a fire and subsequent rebuilding halted operations.

The difficulty here varied somewhat from that usually faced. Juice Industries plant is not in an industrial district, but is close by the residential section of Dunedin and the banks of Clearwater Bay. Plant waste had been pumped into this bay, which is used by permanent residents and visitors to Dunedin, Clearwater and neighboring communities.

After many alterations in its methods of handling the effluent, the company finally arrived at its present solution. True, it may not be the last word—but the amount of fermentable waste has been so greatly reduced that it is no longer highly objectionable in either water or air pollution.

Conditions Described

When the problem was first tackled in 1940, the plant was expelling liquid waste in the following proportions: 45 gpm. containing 12 percent solids, or about 65,000 lb. per day; 50 gpm. containing 1.5 percent solids, or about 9,000 lb. per day; and 30 gpm. of waste water containing no solids. Of the waste solids, 60 percent were fermentable within 6 hr.

At the present writing, the waste has been brought down to 50 gpm. containing 0.54 percent of solids, or 3,200 lb. per day, of which only 10 percent is fermentable within 6 hr. And this will be even further reduced by the use of small pumps and conveyors (now being installed) that will gather some of the waste solids.

This result was achieved while output at the plant was being expanded 40 to 50 percent over 1940.

The steps were taken one by one. And as each move achieved some degree of reduction of the disagreeable features of the waste disposal, further study was given to what could next be done to bring about still greater improvement. This work has been in charge of Ben L. Skinner, research director.

When all of the waste was dumped into the bay, back in 1940, the results were serious. Fermentable solids liberated hydrogen sulphide that set up odors, killed fish and seaweed, and discolored homes. This brought complaints, then lawsuits from residents.

Ponds Were First Step

Before the following packing season started (in 1941), ponds were installed a short distance from the plant. Effluent containing 12 percent fermentable solids, or about 65,000 lb. a day, was then discharged into these ponds. The remainder of the waste, containing a relatively small amount of fermentable solids, went into the bay.

This brought a partial solution of the problem, but still was not considered completely satisfactory.

In 1942, when a molasses plant was

added to the citrus processing, one waste problem was solved—but an additional one was created. From the molasses plant, the effluent amounted to 300 gpm. containing 0.1 percent solids, or 3,600 lb. per day. The balance of the plant effluent had by that time been reduced to 50 gpm., containing 1.5 percent solids, or about 9,000 lb. per day; and 30 gpm. containing no solids. Of the 300 gpm. from the molasses plant, 60 percent was fermentable in 6 hr., with 10 percent of the 50-gpm. waste also fermentable within the same time.

All of this was dumped into the bay and created the necessity for some further solution of the problem.

Fermentable Waste Lessened

Next step was installation of aeration tanks, still used today as an integral part of the system. These tanks are innoculated with yeast of the *torula utilis* species, which rapidly converts the sugar in the waste to yeast, hastening the fermentation and thereby lessening the amount of fermentable waste that reaches the bay. With the introduction of the aeration tanks, the ponds were no longer used, all treated waste going to the bay.

Another step, taken in 1944, was installation of propellers in the bay end of the discharge line. This pulled salt water into the line, diluted the waste liquid, increased its specific gravity, and resulted in the disposal material being carried farther out from shore.

It was shortly after this step was taken that a fire, mentioned earlier, destroyed a major part of the plant. It was rebuilt and in operation again in 1947. Then study of the waste problem was resumed. Additional bar screens were installed in the sewer lines to catch trash. The next year there was added a unit that collects about 1 ton of dust a day from the chimneys of all feed dryers. This dust is sold in bulk to local users as feed. The amount of water used in the aeration tanks was thereby reduced, since there was now less dust settling on floors and equipment.

By this time (late 1949), the total amount of effluent had been cut to 300 gpm. containing 0.1 percent solids, and 50 gpm. containing 1 percent.

Still not content, the management now installed condensate centrifuges that removed 2,900 lb. of odorous oil from the waste effluent. An entrainment separator, also put in at this time, resulted in the removal of the 0.1 percent solids in the molasses plant effluent. An oil trap was also fitted to take out the fuel oil and grease drippings that get into the waste stream and complicate the sewer floor.

Thus, the effluent has been brought down to 50 gpm. with only 0.54 percent of fermentable solids, or 3,200 lb per day—all being rendered unobnoxious by the various methods described.

Washings Add to Load

The waste problems of a citrus concentrating and canning plant such as Juice Industries operates—handling 1,600 tons of fruit resulting in 800 tons of peel and waste each working day—are increased by the necessity of frequent washing of machines and floors.

In this plant, machines are washed every 4 hr. and the floors with every change of shift. To be expected are the occasional leaks or spills from storage tanks. And the machines give up a good deal of citrus solids containing the pungent dextro limonene base found in orange oil. This oil is now being recovered from the waste by centrifuges, thereby lessening the odor of the effluent and at the same time providing a new source of revenue, since the oil brings about 4c. per lb.

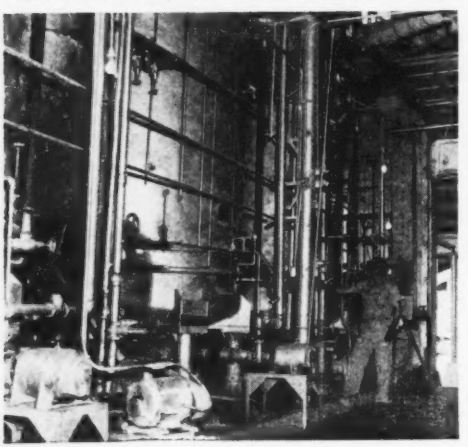
Significance of the pioneer work the company has done is borne out by a proposal that legislation be introduced at the biennial session of the Florida State Legislature to empower the State Board of Health to study effects of the disposal of citrus cannery wastes into Florida waters.

Recommendations for such a bill have come from Louis F. Warrick, chief of the Technical Services Branch, Division of Waste Pollution Control, U. S. Public Health Service, and from Rep. S. Travis Phillips of Hernando County, who will introduce the bill.

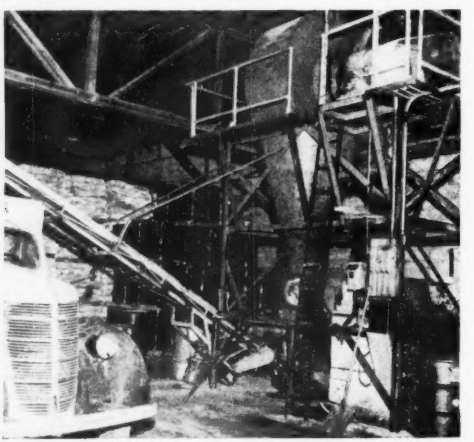
Warrick has said that the U. S. Public Health Service would cooperate in the study, if approved. And at a recent Florida Canners Assn. directors' meeting, he urged members to form a "task unit" to work with other industries in a nation-wide program to alleviate water pollution from plant disposals. "And with the planned study," he said, "you have an excellent opportunity to go forward—but if you wait, your ultimate costs will be many times what they will be if you take action now."

The proposed legislation would not empower the Florida State Board of Health to require any particular disposal device, but would only authorize studies of needs and technics.

Evaporators produce molasses and cyclones recover feed



PRESSED LIQUOR is recovered from peel waste, concentrated in triple effect evaporator, and sold as feed molasses.



DUST, from dryer chimneys, is cyclone-collected and sold as feed. Here, truck is belt-loaded with product.

THROUGH DIFFUSERS of type seen here mounted on ceiling, conditioned air enters the fermentation room without danger of draft-produced crusting.

Advanced Air Conditioning Boosts Bakery Output

It accurately controls room temperature, humidity, and air flow—so that fermentation rates can be quickly fixed to "pay off" in most efficient scheduling

N. FEDER
Chief Engineer, E. Kalisch, Inc., New York City

Optimum production—that can be planned independent of changing weather conditions—is now possible in the bakery through the use of all-year-round air conditioning in the fermentation room.

Advanced air conditioning will prevent any irregularities in fermentation and thus eliminate costly delays due to slow or uneven production. Constant temperature in the room will control the yeast development and thereby establish a constant rate of fermentation.

Through maintenance of a fixed humidity together with regulation of air movement in the fermentation room, loss of moisture from the dough is controlled, thus curbing excessive losses by evaporation and "crusting". Improved product quality also results from the cleanliness and freedom from odors of the conditioned air.

In the larger modern bakeries, kneaded dough from the mixers is discharged into troughs, large steel tubs holding from 600 to 800 lb. of material. When filled, these are stored in the fermentation room—one of the most important departments.

The time required for development of the dough in the fermentation room varies from approximately 2 hr. for straight doughs to 4 to 6 hr. for sponge doughs, depending on the character of the end product. Temperature of the dough when it is brought into the fermentation room is between 78 and 80 deg F. It is obvious that exact control of temperature, humidity and air movement will decisively influence the action of the yeast as well as evaporation from the surface of the dough. If these factors are not correctly controlled, the action of the yeast will not be uniform throughout the dough.

Introduction of the filled trough into the room complicates the fermentation problem on account of the rapid heat transfer between the dough and the ambient air whenever the air temperature varies from that of the dough. If this difference is too high, a temperature gradient between the center of the dough and the outer surface will be produced which may be responsible for graded action of the yeast ferment and non-uniform fermentation.

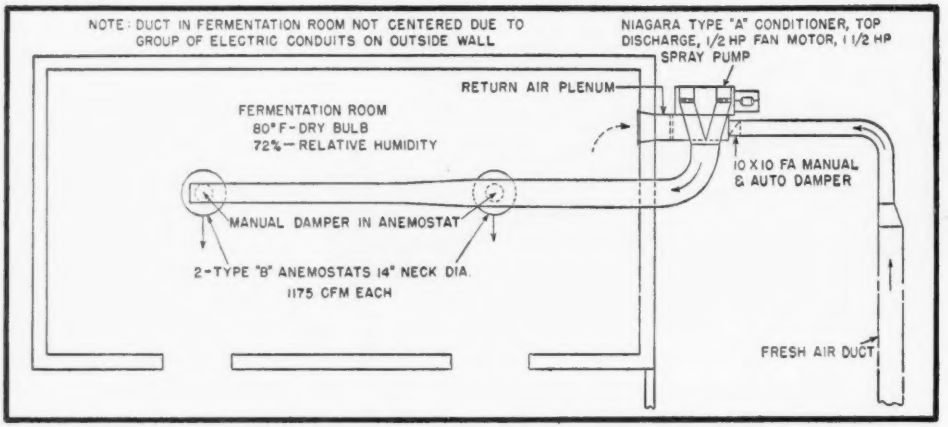
Room Conditions Established

The correct temperature and humidity of fermentation rooms has been established at 80 deg. F. and 72 to 75 percent relative humidity. Under these conditions it is possible to maintain a substantially uniform temperature throughout the dough, with evaporation sufficiently controlled to prevent "crusting" (which retards the gases of fermentation from being discharged).

Importance of proper air distribution in the fermentation room cannot be over-estimated and will now be discussed in connection with the description of a properly air conditioned fermentation room for which the author has been responsible.

Shown in our first drawing is the layout for a fermentation room located in a leading New York bakery plant that processes 12,000- to 15,000-lb. per day of bread dough. The air conditioning unit comprises a special conditioner with self-contained saturating-spray system. Chilled water at 50 deg. F. is supplied to a 3-way valve, automatically controlled. Because this conditioner saturates the air within 1 deg., it is possible to control the relative humidity of the air within extremely close limits. The conditioner also includes a reheat coil to control the dry bulb temperature after the

Hookups of Air Flow Units . . .


NOTE: DUCT IN FERMENTATION ROOM NOT CENTERED DUE TO GROUP OF ELECTRIC CONDUITS ON OUTSIDE WALL
NIAGARA TYPE "A" CONDITIONER, TOP DISCHARGE, 1/2 HP FAN MOTOR, 1 1/2 HP SPRAY PUMP
RETURN AIR PLENUM
FERMENTATION ROOM
80°F-DRY BULB
72%—RELATIVE HUMIDITY
10 X 10 FA MANUAL & AUTO DAMPER
MANUAL DAMPER IN ANEMOSTAT
2-TYPE "B" ANEMOSTATS 14" NECK DIA. 1175 CFM EACH
FRESH AIR DUCT

LAYOUT of fermentation room in leading New York bakery. Conditioning unit located outside room, sends air in continuously via stainless steel ducts and diffusers. Constant temperature and relative humidity are maintained.

moisture content of the air is fixed.

The fermentation room runs 10,750 cu. ft. in size, and the total refrigeration load needed is 2.6 tons. The air conditioner is designed to maintain a dry bulb temperature of 80 deg. F. and a relative humidity of 72 percent in this room. Located outside the room, the unit delivers 2,350 cfm. of air into a stainless steel duct that discharges it into the fermentation room through two Anemostat Air Diffusers, Type AR-1, size 35. Each diffuser has a capacity of 1,175 cfm. and a neck velocity of 1,100 fpm. These units introduce the air evenly without the danger of draft-produced crusting.

The schematic pipe layout of the installation is shown in our second drawing. Water is supplied to the chilled tank from the city line. The spray water pump of the conditioner is directly connected to a 1½ hp. motor. A special pump, put into operation by a float-actuated solenoid and pump switch, returns over-flow water from the conditioner to the chilled water tank. This hookup not only saves water but makes the system very economical by taking advantage of the difference in temperature between the city and returned water.

Uniformity Is Essential

It is absolutely necessary to keep the room conditions as constant as possible. Uniformity of humidity is as essential, in a fermentation room, as the quantity of moisture. In order to maintain automatic temperature and humidity control, a pneumatic control system operated at 15 psi. is used.

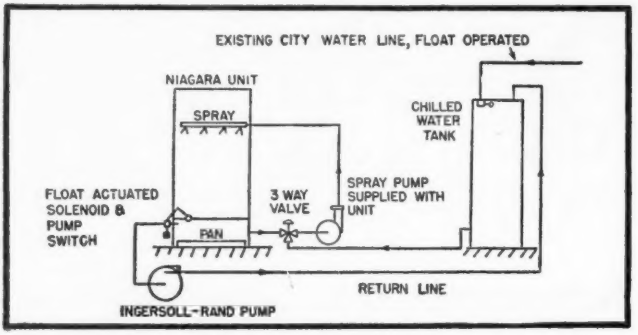
The system has two separate thermostats. One is a direct-acting room unit operating a modulating steam valve in the reheat coil. The other is a reverse-acting dew point unit controlling the spray water temperature. This system gives precision results with tolerances of 1 deg. F. in temperature and 1 percent relative humidity, as indicated daily on the recording charts.

In addition to correct temperature and humidity conditions, proper air distribution must be considered. As one investigator says: *"The history of fermentation-room air conditioning development shows a constant wrestling with the problem of more efficient introduction of air into the enclosure.*

"The air distribution system in the fermentation room is of exceptional importance, since it is necessary to handle sufficient air volume to pick up the sensible heat load during periods of high outside dry bulb temperature conditions without producing too great air turbulence over dough surfaces.

"There is practically no latent heat load because of the high dew point temperature maintained within the enclosure. This means that the allowable dry bulb temperature rise is limited to approximately 9 deg., which makes it necessary to handle a considerable volume of air to pick up the mid-summer heat load."

. . . And of Water Piping



SCHEMATIC of water piping shows circulation system. Note special pump which returns over-flow water from conditioner to chilled-water tank.

Air Movement Is Continuous

In the fermentation room described earlier in the article, the number of air changes are about 13 per hr. Further, great care is taken to introduce the air in a manner providing a continuous air movement in the room without creating undue turbulence over the surface of the dough.

If possible, the fermentation room and the mixing room should be sepa-

(*Turn to page* 155)

Containers for foods put up for the armed forces must be sturdy enough to withstand rough handling and to safeguard the packaged goods inside under extreme conditions. Here, subsistence supplies are being covered with tarpaulin for protection in an open storage area at Pusan Quartermaster Base Depot in Korea. (U. S. Army photo)

MILITARY PACKAGING

What's Needed . . . What's Perplexing . . . What's Being Done

Food for the armed forces must be put up by available machines in convenient packages that provide suitable protection. Cited are major accomplishments of laboratories in meeting container specifications and getting desired materials

ALBERT V. GRUNDY and FRANK RUBINATE

Chiefs, Containers Laboratories and Subsistence Packaging Division, respectively, Food & Container Institute for the Armed Forces, Chicago

There are difficulties encountered in the packaging of foods for the armed forces that are, perhaps, not fully realized by the food industry, whose main experience has been in the manufacture and distribution of foods for the civilian domestic market.

To indicate the perspective, therefore, this article is offered for the purpose of showing—

- **Chief properties required in containers to meet supply-line conditions**
- **Representative accomplishments of the container laboratories in fulfilling the requirements, and**
- **Desired, but not yet attainable, materials for solving persistent container problems, such as resistance to temperature extremes and inadequate storage controls in overseas stations**

Food packaging for the armed forces has three prime objectives—(1) utility, (2) manufacturing practicability, and (3) preservation of contents. These may be defined, in turn, as follows:

1—Utility

In its military sense, this involves consideration of the convenience with which the package may be transported and stored, and of the ease with which it may be carried and eventually opened by the fighting man. Consequently, the package must be relatively light in weight, rugged, and compact, yet afford maximum capacity. As for the ease of access to contents, it must permit ready opening with equipment

Requirements Table Follows, Article Continues p. 114

TABLE I—CONTAINER REQUIREMENTS Listed in Terms

Type of Foods	Ration, Where Used	Present Packaging	Handling & Storage Hazards to Consider	Qualities Required to Protect Contents
1. Dehydrated Soup Mix Pea & Bean (Purchase Desc. 10 Aug., 1950)	Frigid Trail	Flexible packaging (aluminum foil coated with or laminated to vinyl or heat-sealable coating.) Holds 1½ oz.	Storage at extreme low temperatures which cause embrittlement of plastics, and exposure to rough handling after issuance of complete ration.	Flexibility of materials at extreme low temperatures and ability to withstand rough handling
2. Dehydrated Soup Mix Bouillon (Mil-B-1112A 17 May, 1950)	Individual Survival Packet	Flexible package (acetate laminated to aluminum foil, and coated with odorless and flexible heat-sealing compound on foil side.)	Same as (1). Packet designed for air force personnel in Arctic.	Same as (1).
3. Cream of Tomato Soup, Condensed (JJ-S-581 28 April, 1931 with Change No. 1 28 Dec., 1950)	Special Item Supplement Pack for Hospital Use	Round cans. Body hot-dip tinplate and enamel-coated ends either of same material or electrolytic tinplate.	Conditions are slightly intensified over those in civilian handling. High humidity creates possible corrosion. Military handling results in impact damage more frequently than commercial practice.	Ability to withstand rough handling and high humidity.
4. Canned Ham Chunks (Mil-H-1021A 16 May, 1950) (Amend. 1 17 Jan., 1951)	5-in-1	30 oz. of product packaged in round cans with body and ends of commercial tinplate. Ends enameled inside. Outside coated with corrosion-resistant lacquer or enamel.	Same as (3).	Same as (3).
5. Frankfurters (Mil-S-3069 26 Oct., 1949) (Amend. 1 2 June, 1950)	5-in-1	Same as (4).	Same as (3).	Same as (3).
6. Meatballs & Spaghetti (Jan-M-682 30 Sept., 1948)	5-in-1	Same as (4).	Same as (3).	Same as (3).
7. Luncheon Meat (Mil-L-1080A 21 June, 1950)	5-in-1	Rectangular key-opening cans. Made of hot-dip tinplate.	Same as (3).	Same as (3).
8. Dehydrated Meat Food Bars (Mil-M-3421 19 Feb., 1951)	Frigid Trail	Flexible packaging (pouch-type bag of aluminum foil laminated to cellophane—this sheet laminated to rubber hydrochloride base.) Bag heat-sealed on 3 sides before filling. After filling, vacuum-sealed on 4th side and seams folded flat against bar.	Same as (1).	Same as (1).
9. Canned Ham & Eggs (Mil-H-1038A 31 Mar., 1950) (Amend. 1 12 Jan., 1951)	5-in-1 Individual Assault Packet	Round can. Inside enameled and sprayed with a shortening material or gelatin solution. Or enameled and lined with special lard-vegetable parchment. Small size (300 x 200) for individual serving.	Same as (3).	Same as (3) plus resistance to additional rough handling can receives when carried by soldier in combat.
10. Solid-Pack Canned Chicken (Mil-C-1058A 13 April, 1950)	Individual In-Flight Combat Packet	Hermetically-sealed open-top round cans. Hot-dip tinplate. Small size (300 x 200) for individual serving. Enamel-coated overall inside, and with soldered side seams and compound-lined, double-seamed ends.	Same as (3).	Same as (3).
11. Solid-Pack Canned Hamburger (Mil-H-1048A 30 June, 1950)	Individual In-Flight Combat Packet	Hermetically-sealed open-top style round can of commercial tinplate—with soldered side seams and compound-lined double-seamed ends. Small size (300 x 200) for individual serving.	Same as (3).	Same as (3).
12. Green Beans (Wax beans also included in B-Ration components) (JJ-B-151b 3 Nov., 1948)	5-in-1 B-Ration*	Round cans of tinplate with soldered side seams and compound-lined double-seamed ends. Body of hot-dipped tinplate. Ends of electrolytic tinplate coated on inside.	Same as (3).	Same as (3).
13. Dehydrated Onions (Mil-O-3028 8 August 1949) ("Ration, Individual, Trail, Frigid" New military specification now available.)	Frigid Trail	½ oz. packaged in a foil envelope approximately 5 in. long x 3½ in. wide, with a ¼ in. wide heat seal. Made from dead soft aluminum foil coated on one side with odorless and permanently plastic heat-sealing compound that provides moisture-resistant closures.	Same as (1).	Same as (1). Package must prevent onion odors from permeating other rations.
14. Fruit Jam (Z-J-96a 25 April, 1950)	Individual Combat	(a) Seamless 1½ oz. can made of hot-dip tinplate and with inside enamel coated. Lid provided with sealing gasket and closed with annular aluminum band, with tear tab crimped over curled top, band gold-lacquered inside. (b) Seamless 1½ oz. can made of hot-dip tinplate, and with inside enamel coated. Double-seamed, hermetically-sealed style top. Top scored to facilitate puncture-opening. Both cans small size (300 x 200) for individual serving.	Same as (3).	Same as (3).

of Types of Food and Military Supply Line Conditions

Type of Foods	Ration, Where Used	Present Packaging	Handling & Storage Hazards to Consider	Qualities Required to Protect Contents
15. Canned Apricots (Z-A-631a 20 June, 1941) (Mil-C-1501 Canned Subsistence Items, Packaging & Packing 28 Oct., 1949) (Amend. 1 30 June, 1950)	Individual Combat Individual In-Flight Combat Packet	Round, hermetically-sealed open-top metal can with soldered side seam and compound-lined double-seamed ends. When specified, can shall have slipcover reclosure of electrolytic tinplate with skirt about ½ in. deep, and with such diameter as to fit snugly over double seam at one end. Small size cans for individual serving.	Same as (3).	Same as (3).
16. Dried Pears (Z-P-206a 2 July, 1946) (QM Pow. No. 1 Dried Fruits Thermoplastic Packaging)	B-Ration*	Packaged in a "two-pound shell" or a "raisin container." (a) 2-lb shell—shall conform to standard commercial shell used for prunes, and may be used either with or without conventional waxed paper or glassine inner bag. If liner used, shell is made of kraft-lined or news-lined chipboard. If liner is not used, shell is made of single manila-lined chipboard. In either case, lined side of chipboard shall constitute inner surface of shell. (b) Raisin container shall be made of single manila-lined chipboard, No. 2 finish. Manila-lined side shall form inner surfaces of container.	Rough military handling and high stacking result in greater-than-usual impact and pressure damage.	Ability to withstand stacking pressures and be resistant to rough handling.
17. Cereal Bar "Cereal, Compressed, Premixed" a. Block (Mil-C-1045A)	Frigid Trail Individual Survival Packet	Tightly wrapped in sheet of dry finish aluminum foil. Closure effected by pressing end folds against ends of bar.	Storage at extremely low temperatures which cause embrittlement of wrapping.	Same as (1).
18. Soluble Tea (Purchase Desc. 16 Aug., 1950)	Frigid Trail Individual In-Flight Combat Packet Individual Survival Packet Special Item Supplement Pack for Aid Station Special Item Supplement Pack for Hospital Use Survival Packet	Envelope of cellulose acetate laminated to aluminum foil with suitable odorless and permanently plastic compound other than wax. Laminated sheet coated on foil side with film of odorless and permanently plastic heat-sealing compound to provide tight, moisture-resistant closures. Contains 1.6 g. Can hermetically-sealed and open-top style with electrolytic tinplate and soldered side seam and compound-lined double-seamed ends. Contains 5 oz.	Storage at extremely low temperatures which cause embrittlement of plastics, and storage at extremely high humidity.	Flexibility of materials at extremely low temperatures and ability to withstand high humidity.
19. Soluble Coffee "Pure" and "Product" (Mil-C-1019B 30 Jan., 1951)	All of the above plus 5-in-1 Individual Combat	(a) Envelope same as (18), but holds 2.5 or 5 g. (b) Can, same as (18), but holds 2 or 4 oz.	(a) Envelope, same as (18). (b) Can, same as (3).	(a) Envelope, same as (18). (b) Can, ability to withstand rough handling and humidity.
20. Sweet Chocolate Bars "Candy & Chocolate Confections" (Mil-C-10928 (QMC) 12 Feb., 1951)	5-in-1 Ration Supplement Sundries Pack Food Packet Individual Assault	Flexible package (cellophane, glassine or greaseproof paper) with continuous seal along seam and end closures. Wrap shall conform to shape of bar.	Danger of fat seepage at high temperature.	Fat-resisting material.
21. Powdered Whole Milk (Mil-M-1495 28 Oct., 1949)	Ration Supplement, Special Item Pack, Hospital B-Rations*	1-lb. open-top, key-opening reclosure style metal can and 5-lb. open-top metal can (key-opening reclosure style if specified). Both size cans to be hermetically sealed with vacuum displaced by inert gas previous to sealing. Soldered side seams and double-seamed compound-lined ends.	Same as (3).	Same as (3).
22. Cocoa Beverage Powder (Mil-C-3031 30 Aug., 1949) (Purchase Desc. "Ration, Individual, Trail, Frigid" New military specification now available.	Frigid Trail Individual Combat	Packaged in 2-oz. compressed discs and 1½ oz. envelope. Disc—wrapped and heat-sealed in cellophane. Wrap shall be siftproof and conform closely to contour of disc. Envelope—Flat duplex type, made of kraft paper coated with plastic film on inside. Top and bottom heat-sealed. Lengthwise seal of plastic film shall be a heat-sealed lap seam, and lengthwise seal of paper shall be lap seam made with good low temperature adhesive. Size 5 in. long x 3½ in. wide inside.	Same as (1).	Same as (1).
23. Lemon Juice Powder (Synthetic) (Mil-L-1066A 14 Oct., 1949) (Amend. 1 29 May, 1950)	Ration Supplement, Spice Pack, Kitchen	Hermetically-sealed open-top style round can of electrolytic tinplate, or with body of electrolytic tinplate and ends of bonderized blackplate. Soldered side seams and compound-lined, double-seamed ends. Bonderized ends must be enamel-coated on inside. Contains 12 oz.	Same as (3).	Same as (3).

* B-Ration items packaged in bulk for mass feeding. Items are described in specifications for individual commodity.

normally at the disposal of the soldier, sailor, or airman.

2—Manufacturing Practicability

This entails such considerations as the availability in quantity of specific packaging materials, their cost and adaptability to fabrication on such machines as are generally available.

3—Preservation of Contents

Most important by far is the preservative function of armed forces' packaging. Attainment of success here is complicated by two factors—the great variety of foods procured by the military and the frequent extremes in rough handling and adverse conditions imposed on packages by the "supply line."

There is no need to dwell here on the quite obvious fact that the unique properties of each food call for individual packaging considerations. However, the rigors of the military supply line are sufficiently unusual to warrant additional explanation.

Briefly, from the moment the package of food comes off the supply line until it is finally opened and used on the firing line, it must be prepared to "take it." It may be exposed to excessive cold and burning heat, tropical humidity, immersion in water, rough handling during repeated loadings and unloadings, jolting in cargo holds and in freight cars, bouncing in the backs of trucks, and rough manual portage.

If these tribulations are not sufficient, there is the ever-present danger of attack by insects and rodents, and, in tropical climates, the ravages of mold contaminations. Vulnerability to pilferage is still another problem.

Table I illustrates, by means of representative foods, the specific conditions that existing packaging must meet. It is, of course, understood that any or all of these presently satisfactory packaging materials might eventually be superseded when, and if, a superior material is developed.

There is also, of course, the possibility of hindering material shortages.

This table is designed to provide an overall picture of the range of armed forces' problems with reference to the specific rations involved. Specification number and date are included for each product. However, since the reader may also wish to consult the specification of the particular ration involved in any given case, a complete ration listing may be obtained from the QM Food & Container Institute.

Packaging Improvements

After reviewing the Table I presentation of the overall packaging program, it will be interesting to consider some special packaging problems that the QM Food & Container Institute has met and at least tentatively solved. These solutions are the best answers to specific problems that are attainable at present. They represent the improvements suggested by intensive laboratory and field tests.

Tables I and II are representative of the great number and variety of

(*Turn to page* 176)

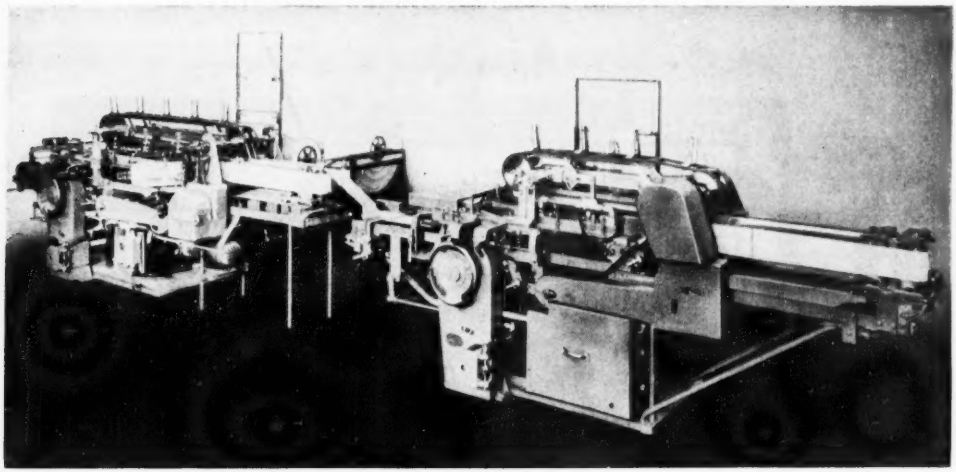
TABLE II—REPRESENTATIVE PROBLEMS Investigated by QM Food & Container Institute and Progress on Their Solutions

Item	Original Packaging Difficulty	Tentative Solution Provided
1. Canned Bread (Mil-B-1070A 7 Dec., 1950)	To manufacture a sterile product under baking limitations. Product must be baked in can with cover loosely attached, and sealed after baking. Contamination must be avoided. Corrosion of inner can walls after prolonged storage noted.	Manufacturing difficulty overcome by adapting handling and baking technics to limitations described. Corrosion problem may be solved through changes in the dough formula and use of an inside enamel or liners.
2. Container for Jam (Z-J-96A 25 April, 1950)	Each of two types of cans currently acceptable is deficient. "Tear-tab" can often fails due to breaking of tab. Sharp instrument needed to open can. One company produces this can at present. "Scored-top" can has a scored line for opening with sharp instrument or folding can-opener. In field, utility of this type opening is unsatisfactory.	Ribbed slip-cover can is now being investigated. Slipcover is held down snugly over a gasket by pull of vacuum inside can. Rib allows a fulcrum for easy opening with coin or sharp instrument.
3. Vacuumized Foil Package for Dehydrated Meat Bar (Mil-M-3421 19 Feb., 1951.)	Originally, problem was to reduce high percentage of leakers (as high as 60-70%) which caused packages to lose vacuum. Present problem concerns adhesives which impart unpleasant flavors and odors.	A change in packaging technic followed by another in packaging that together reduced leakers to about 2 percent. Adhesives problem is under investigation.
4. Packing Glass Containers (Specifications included under commodities packaged in glass.)	Principal problem is breakage due to insufficient protection from packing materials. Currently acceptable methods of packaging that overcome this are not entirely satisfactory because of high cost, excessive bulk or weight. Present methods include all weatherproof boxes (V and W board) construction, domestic containers cushioned with excelsior and overpacked in nailed wood boxes, and nailed wood boxes with excelsior or sawdust between glass containers.	New method of packing has been proposed and is currently undergoing tests. It requires shipping each bottle into a prefabricated cellulose-wadding pocket sleeve ½ in. thick. Sleeve is folded over top and sealed. Each cushioned bottle is placed in compartment formed by cell spacers. Container and inner packing are of water-resistant material. Pack gives promise of providing adequate protection without undue bulk and weight.
5. Packaged Fresh Bread (Experimental)	To accomplish manufacture of packaged bread that will remain fresh for 6 mo. without mold development.	Encouraging results with saran wrappers. Investigating use of regenerated cellulose, coated to reduce moisture-vapor transmission.

TABLE III—PACKAGING and Packing Problems Requiring Attention

Problem	Chief Present Deficiency	Desired Solution
Package for powdered vinegar.	No package yet developed.	Package other than glass that will withstand corrosive action of contents (a very damp powder containing glacial acetic acid).
Packaging for molasses and chocolate syrup.	Lack of information for optimum packaging of dense products of this nature.	Development of new packaging materials or processes through stimulated interest among food processors.
Packaging for shredded wheat.	Commercial package not adapted to overseas use (contents vulnerable to oxidation).	Material needed to prevent rancidity. Possibly a "breather" type of material that will permit escape of gases and prevent entry of external fumes or deleterious odors and oxygen.
Siftproof carton or bag.	No adequate test method or standards available.	An adequate test method and standards for defining siftproofness.
Flexible containers for processed foods.	No adequate substitutes for metals, which may be in short supply in event of emergency.	Need for metal substitute that will withstand processing temperature and handling to same degree required of metal.
Information on sizes, packing materials, and products.	No precise information on limitations for packaging equipment.	Necessary surveys to furnish information on what can and cannot be accomplished with available machines.
Shelf life of packaged foods under military storage.	No correlation between accelerated and actual storage conditions.	Coordination of all data on long term storage under adverse conditions, particularly on extreme temperatures and humidities, in respect to what actually happens during storage and shipment—i.e., temperature and humidity fluctuations (day to night, daily variations, seasonal variations, during transportation from one geographic location to another, and air transport).

NEW EQUIPMENT & SUPPLIES

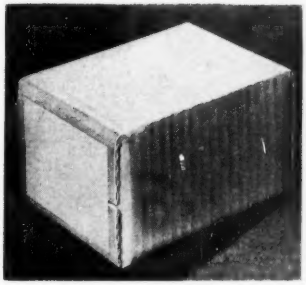


Machine Applies Insulating Wrap on Ice Cream Cartons

In this tandem hook-up of wrapping machines, unit at left encloses a pint size ice-cream carton in an insulating wrap of corrugated material, making it unnecessary for retailer to insert carton in an insulated bag.

Continuing to machine on right, carton then gets a printed over-wrap.

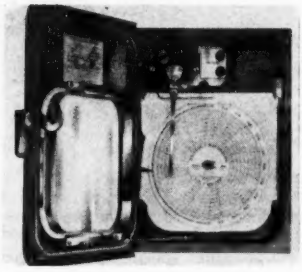
Test have shown that the new corrugated wrap (see photo) effectively prevents melting of the ice cream. The insulating-wrap unit, known as a special Model FF, uses corrugated material in large rolls. It cuts the material from the roll, slits it for end-folds, scores and forms it neatly around the entire carton, then automatically applies end-seals that hold the folded ends of the corrugated wrap firmly in place. Its speed is from 60 to 80 cartons per minute.



This special model, now in operation at H. P. Hood & Co's Boston plant, is hooked up with a standard model FF machine to which it feeds the corrugated-enclosed cartons for the final wrapping in a printed waxed-paper wrapper. Another tandem hook-up serving Plantation Foods, Uleta, Fla., wraps six small cartons containing individual servings of ice cream. Cartons are fed into the machine in such a way that they are corrugated-wrapped in two rows of three each.—*Package Machinery Co., East Meadow P. O., Springfield, Mass.*

Circle 115A on Reader Service Card

Recording Mechanism on Voltmeters, Ammeters



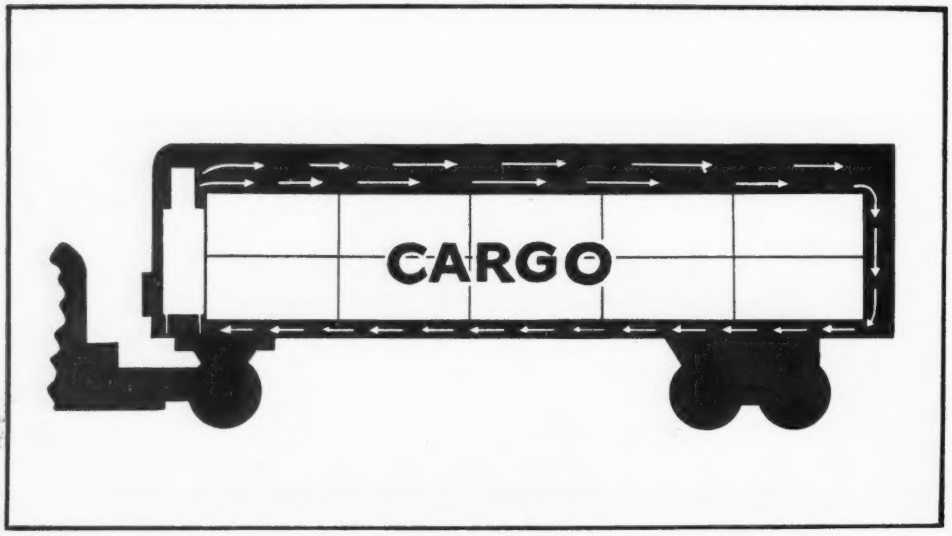
Featured in a new line of recording voltmeters and ammeters is an entirely new measuring mechanism, also a number of other improvements.

Identified as the Series 500 Electric Recorder, this instrument makes a continuous record of voltage or current on an 8-in. circular chart. The new moving-iron measuring mechanism produces a high actuating torque at a low electrical burden. There are shock-protected precision stainless steel bearings, magnetic damping, and a locking device to prevent damage due to rough handling.

Instruments are housed in a compact die-cast aluminum alloy case which is moisture-, fume-, and dust-proof.

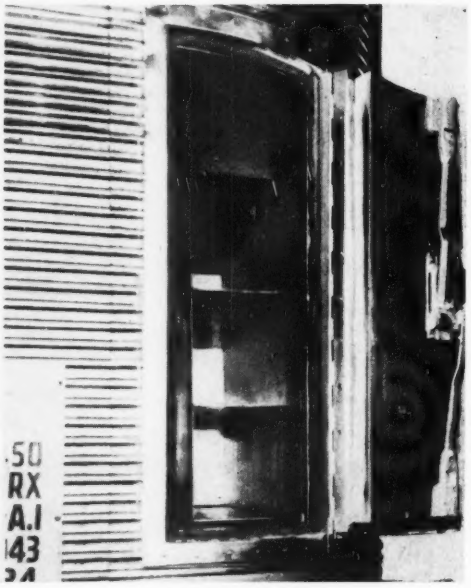
The units are furnished in a variety of models for wall, surface-panel or flush-panel mounting, for either open terminal or conduit connection, as well as portable and pole mounting models.—*The Bristol Co., Waterbury 20, Conn.*

Circle 115B on Reader Service Card



How cold air circulates

Unit installed



Dry-ice door

Cargo Cooler Requires Little Space, Low Maintenance

Compactness and light weight (only 300 lb.) are notable features of this transport refrigeration system. Installed unit extends only 19 in. from front wall of cargo section. Further, maintenance is minimized because only moving parts are two small fan motors.

Refrigerant used is dry ice under control of thermostatically governed air circulation that maintains uniform temperature through and around all parts of cargo. Operating automatically, system is reported capable of holding specified temperature between 0 and 60 deg. F.

Unit bolts to floor in nose of truck or trailer. It is a sturdy welded-aluminum dry ice bunker, 75 in. high,

with finned exterior walls providing over 12,000 sq. in. of super-cold surface for rapid absorption of heat from a controlled, circulated air stream. Located in unit are two air-foil type, axial-flow, electric fans of low power requirement. These are powered by the tractor's battery.

Blowers are available for either 6v. or 12v. battery systems. They direct the air stream to effect a blanket of circulating refrigerated air around the entire cargo (see top illustration at left.) Thermostat is located in rear of cargo space. System moves more than 800 cu. ft. of air during refrigerating cycle.

Carbon dioxide resulting from dry-ice melting may be vented to outside, or to cargo space if desired to benefit perishables. System is stated to eliminate any possibility of moisture drip on cargo and to provide protection against freezing of perishables that shouldn't be frozen.

Cooler will hold twelve 50-lb. blocks of dry ice on three shelves. Latter are directly connected with fin surfaces. Since air never passes directly over ice in bunker, blocks diminish only in height as heat is absorbed. Dry ice is loaded easily through an access door in side of vehicle.

Large dry ice capacity (600-lb.) practically eliminates necessity of re-icing, except at terminals. On short runs only a small quantity of dry ice need be used. Amount of refrigerant required is determined from a chart.

An accessory 110v. standby power unit is available for operation of cooler independent of the vehicle battery during layovers and emergencies. —*Hunter Manufacturing Co.*, 1550 *East 17th St., Cleveland 14, Ohio.*

Circle 116A on Reader Service Card

Lightweight Aluminum Boxes Are Sanitary, Rugged

Food plant operators report these new materials handling containers are clean, economical, light, and strong.

Known as "Alumi-Lug," container has all the requisite advantages of a good tote box. Made of Alcoa aluminum, 0.072-in. thickness, it is reported finding wide acceptance among processors, meat packers, jobbers and distributors.

Box is acceptable hygienically on two counts, with the aluminum giving high resistance to corrosion. Container has been constructed so that it is free of corners or crevices where bacteria might collect.

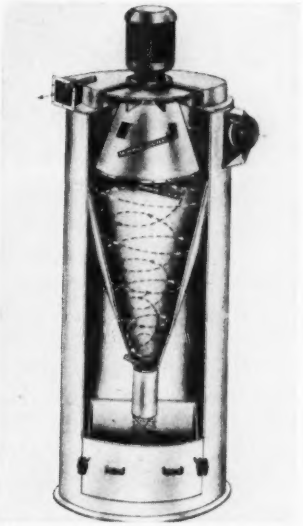
Container's special heat-treated stacking bar acts as a "floor," and its non-lock, tapered construction prevents crushing of meats and perishable foods. It is possible to stack five or more completely filled containers on top of each other (with a total up to 1,000 lb.) because each container rests on hinged bars (photo). Latter are also used by the employees for carrying the box.

Due to special design near outside top and container's tapered construction, boxes when not in use may be stacked ceiling high without sticking or jamming. Thus replacement costs are decreased, as is the need for large storage space.

Tensile strength of aluminum used in box—45,000 psi.—enables container to withstand road shocks, and other rough handling. The light weight combined with strength means less strain and fatigue on workers.

States maker: On an estimated life of 10 yr. for box, the average annual cost is less than $1.60 per box, or about 1¢ per trip based on an average of 150 local trips per year.—*J. M. Gordon Co., Inc., Glendale, Calif.*

Circle 117A on Reader Service Card



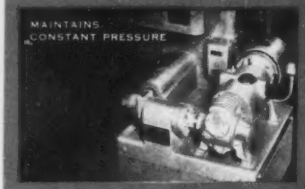
Compact Dust Controller Operates Independently

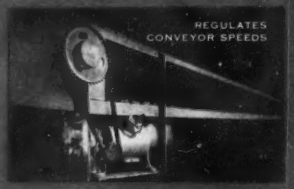
Effective control of dust in remote and restricted areas is now reported possible without need for a central dust-control system—through use of a special dust controller designed to operate as an independent unit.

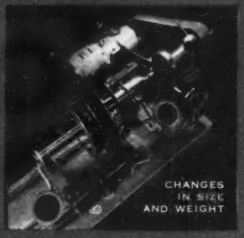
The new unit is stated to provide maximum recovery over a wide range of volume at low operating cost.

The controller incorporates a separator and exhauster in a self-contained compact unit. Air-dust separation taking place in the unit is described by maker as a patented two-stage action utilizing internal skimmers.

Dust-laden air enters at side of unit and spirals smoothly down to cone outlet. As cleaned air spirals up







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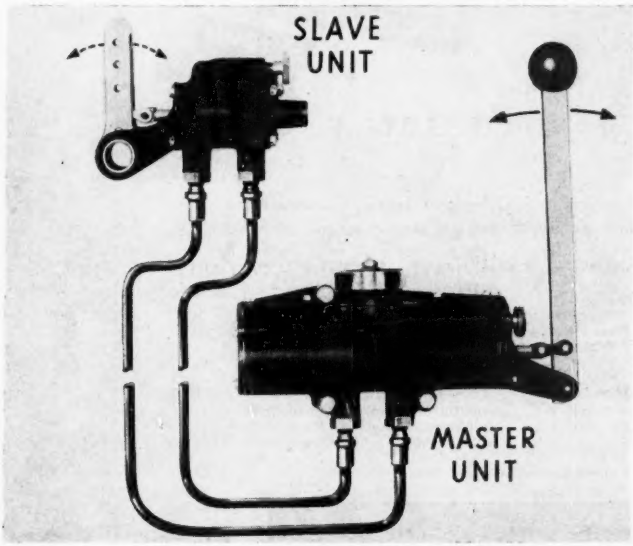
through internal skimmer stack, most of the extra-fine dust particles, carried upward with the outgoing air, are concentrated by the tapered stack. Here the dust particles are skimmed off and then are returned to the dust outlet.

The smooth, continuous, air travel from inlet to outlet is said to eliminate power-consuming eddy currents and back pressures caused by changes in direction of air flow. Unit operates at 6-in. external static pressure, and fan can be discharged at any 45-deg. interval.

Models are available in four sizes from 500 to 2,000 cfm. and can be furnished with or without secondary filters.—*The Day Co.*, 810 *Third Ave., Northeast, Minneapolis* 13.

Circle 117B on Reader Service Card

Hydraulic Control System Quickly Hooked In



Easy installation and operation are reported to feature the Superdraulic, a new hydraulic remote control system. It consists of a master unit and a slave unit interconnected by two small tubes.

Motion applied to the actuating lever of master unit is accurately duplicated by the slave unit lever. There is positive load carrying ability in both directions because operation is not dependent upon springs, compressed air, or valves.

Primary feature is provision for expansion and contraction of both fluid and metal due to temperature changes in a manner assuring synchronization between master and slave. An automatic lock in slave lever stops reverse flow. Slave unit is also available without this locking feature. Either unit may be mounted stationary or movable and in any position without affecting the operation of the control system.

Design of the system eliminates bell cranks, rods, linkage, cables, gears, sprockets and chains with the aim of giving smoother operation and greater rigidity under load. No external power source is required. And the system is stated to be ideal for manipulation of throttles and other controls.

Self-lubricating for minimum wear and maintenance, units are adaptable to most remote control applications. Present size is capable of handling 500 in. lb. of torque. Other sizes will be available soon.—*Superdraulic Corp.*, 14256 *Wyoming Ave., Detroit* 4.

Circle 119A on Reader Service Card

Holds Bags Securely, Reduces Dusting

Savings in bag material, time and labor are reported with use of the Twirl-Tite Bag Holder in filling from overhead supply or storage hoppers, or from bins (such as dust collecting systems).

When used in a filling and packing operation, the mechanical suspension hold of the unit permits maximum use of the bag capacity and denser packing. Production is increased, since bags can be filled at maximum speed. One man can handle several filling stations, since operator's hands are free. Heavy manual lifting is eliminated because the unit holds the bag for release to a conveyor.

Holder mechanism operates in conjunction with a specially designed filling spout. This special spout has a connector flange at the upper end for bolting to the supply hopper or other equipment. At the lower end is a bag supporting flange. The bag twirling mechanism is mounted on one side of the spout, with the fingers of the Twirl-Tite located just above the bag-supporting flange.

Operator securely attaches the bag in a matter of seconds by simply pulling it up around the spout and between the two fingers.

When the fingers are then actuated, they twirl the bag material and fold it upon itself, constricting the bag mouth above the flange.

Weight of the bag is held by the flange, not by the fingers or the neck of the spout. As the bag fills, the weight pulls the bag smoothly and evenly down along the flange. Unit thus puts the load uniformly on the entire bag and avoids bag-tearing stresses.

The folding back and complete twisting over of mouth of bag above flange results in a dust-tight closure. There is no leakage between filling spout and bag. The bag is held securely until operator releases it.

The unit is manufactured for either hand or power operation. Power-operated model has a reversible torque

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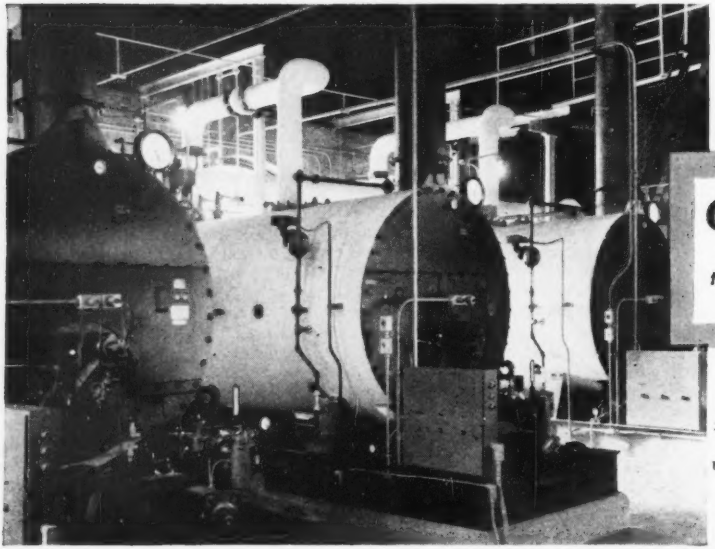

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motor and foot pedal switch. On manually operated unit, twisting fingers are put into action by simply pulling out automatic locking handle. Holder is supplied with or without special flanged steel spout, which is fabricated to customer requirements. Drawings of correct design will be supplied when customer wishes to make his own spout.

Dimensions of holder mechanism: Power model, approx. 10 in. sq. x 16 in. high; hand model, approx. 4½ in. wide x 6 in. high x 20 in. long.—*B. F. Gump Co.*, 1325 *So. Cicero Ave., Chicago* 50.

Circle 119B on Reader Service Card

Auto Battery Operates Platform Lift-Stacker

An ingenious combination fork lift-stacker and hand truck with elevating platform, just announced, operates from a standard 6v. automobile battery.

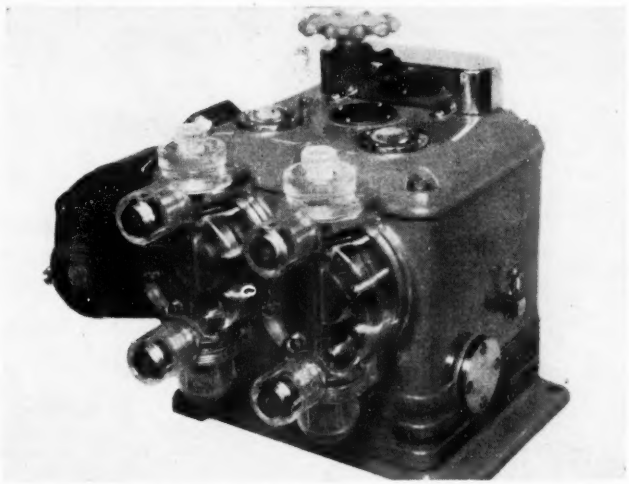
Unit is capable of moving, lifting, and stacking loads up to 750 lb. It has a battery activated motor mechanism that operates the hydraulic lift. What drain is placed on battery under capacity use is replaced by the built-in charger during off-hours. Stacker will lift to a loading height of 55 in. in 6 sec.

Simple built-in charger can be plugged into any outlet.

Stacker has a platform 21 in. long x 18 in. wide as standard. Unit is highly maneuverable—having large load wheels in the back and swivel casters at the front.—*Clark-Hopkins Equipment Corp.*, 1124 *Spring Garden St., Philadelphia* 23.

Circle 121A on Reader Service Card

Dual-Feeder Employs "Visibility" Heads



Solutions or slurries can be drawn from a container and forced into a line or vessel under pressures up to and including 100 psig. with this new feeder.

Model 2-47 CF unit is a positive displacement, duplex diaphragm pump equipped with two "See-Thru" plastic reagent heads. It is driven by a ¼-hp. motor. Recommended delivery range for the pressure feeder is from 1.0 to 1.5 gph.

By employing special operating cams and rocker bars, the acceleration curve of one feeding head is balanced by the deceleration curve of the second. Resulting delivery from the two discharge ports manifolded into a common line is smooth and pulsation-free. Feed rate is manually adjustable while unit is in motion by means of single stroke adjusting knob controlling amount delivered from each head. It is also manually adjustable by changing position of a V-belt on 3-step cone pulleys.

Mechanism box encloses all moving parts in an oil bath, making pump a heavy duty unit with long life expectancy. Temperature of liquids and slurries fed should not exceed 100 deg F.—*Proportioneers, Inc., Providence, R. I.*

Circle 121B on Reader Service Card

Flour Bin Bearing Made of Nylon

Several advantages are claimed for this nylon bearing, now used in a large bakery's flour bin unloading device.

Bearing is employed in a 30-ft.-long flour storage bin. It operates in conjunction with two concentric unloading tubes that slide along the bottom of the bin. Tubes are connected to a compressed air supply that moves the flour.

Since using the nylon bearing, the bakery has had no problems of flaked-off metal particles.

Because bearings made of nylon provide good abrasion resistance without lubrication, bearing life is excellent, and there is no problem of oil contamination.—*The Polymer Corp., Reading, Pa.*

Circle 121C on Reader Service Card

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IN DISTINCTIVE MULTICOLOR

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GAIRVURE opens up a new field of packaging for the FOOD INDUSTRY. Multicolor reproduction of your products on cartons can now be produced with the utmost delicacy, fidelity and realism. What a revelation when you discover your products SELL ON SIGHT in a GAIRVURE multicolor carton.

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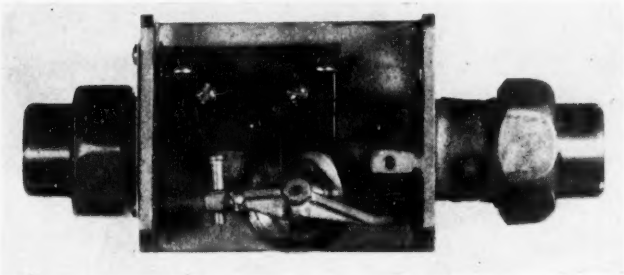
Water Flow Operates Electrical Contact



New features are reported for an improved flow interlock, a device responding to a flow of water to open or close an electrical contact.

Design, maker states, includes a finer differential, union fittings at both ends, a bronze piston, reduced size and weight, simpler adjustment, and more wiring space. Illustration shows side view of unit without cover.

In operation, device closes a contact when water flow exceeds a preset amount, and opens it when the flow falls below value. Working under this principle, it acts like a fuse in circuit depending on water cooling for protection. Interlock can be used as a safety device in many applications, including hot water heaters, welding units, transformer cooling, induction heating, water-cooled dynamometers.

Only one screw adjustment is needed to set circuit for any flow from ½ to 4 gal. per min. Flow differential between cut-in and cut-out of electrical contact is 0.1 gal. maximum.

Interlock does not control amount of water flow. This can be accomplished, if desired, by installing a throttling or regulating valve ahead of device.

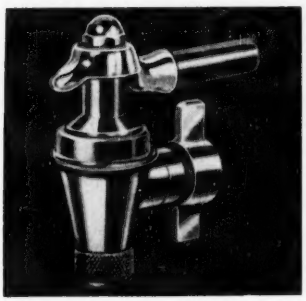
Control is available with union fittings at each end, and a strainer attachment. Strainer keeps foreign matter out of housing, engineers state, while double union fittings simplify installation into a line. For strainer cleaning purposes, only one fitting need be removed. An enlarged switch housing, that makes wiring easy, is protected from water damage by a triple-seal cork and chamois insulation.

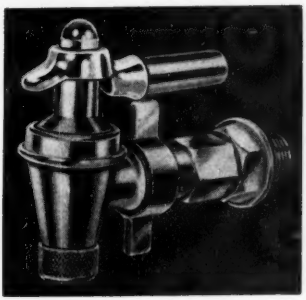
Designed to operate for amount of flow independent of pressure, interlock is intended only for cold-water applications. For use with hot water or other fluids, it is recommended that manufacturer be contacted for more information.

Electrical rating of new flow interlock is 10 amp. at 120 or 240v. a.c. Maximum line pressure device will withstand is 125 psi.—*General Electric, Schenectady 5, N. Y.*

Circle 123A on Reader Service Card

Faucets That Clean Fast and Easy





All parts of these new stainless steel faucets are readily dismantled for rapid cleaning and sterilizing.

Called No-Drip, non-toxic faucets (18-8 chromium-nickel steel), they resist corrosion and avoid contamination of alkaline and acid foods. Standards for equipment used in the handling of liquids have advanced with metallurgical progress.

In these units, the rotating plug and body that come in contact with the liquid are solid stainless. And the shank, which is independent of the head, is lined with stainless steel. The self-seeking rotating plug-type design enables a shearing action that provides definite advantage in the handling of pulpy or fibrous liquids.

Maker states that a moderate advance in cost over units made of less resistant materials is more than compensated by the fact that these faucets will last indefinitely, and that they are far easier to keep clean.—*No-Drip Faucet Co., Cleveland.*

Circle 123B on Reader Service Card

Dual Wheels Ease Lift-Truck Steering

An improved wheel design is stated to provide easier steering on the Model YT-40 (4,000-lb. capacity) fork lift truck.

The trucks are now being equipped with dual wheels, instead of a single wheel, on the steering trunnion. Present single-wheel type Model 40s can be converted, if desired, to dual wheels with a minimum of alteration.

Removal of one easily accessible lock stud permits rapid and convenient tire service and maintenance.

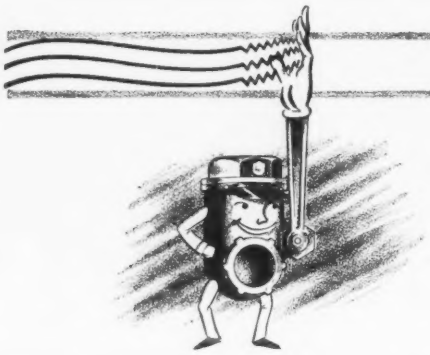
New design has reduced the gear ratio in the steering mechanism from the former 31-to-1 down to 20.7-to-1. Thus, but seven turns of the steering wheel are now required to swing the trunnion 120 deg. Even when truck is stationary, trunnion can be turned with a minimum of effort.

Model 40 industrial-type pneumatic tire size has been reduced to 3.00 x 9 to provide interchange with tires on the Model 20 (2,000 lb. capacity) lift truck.—*Hyster Co.*, 2902 *N. E. Clackamas St., Portland 8, Ore.*

Circle 123C on Reader Service Card

Specify this Fast-action Gate for quick, sure STOP and GO services

JENKINS



BRONZE GATE VALVE

125 lbs. Steam
200 lbs. O.W.G.
½" to 2"

Wherever full, free flow is essential . . . where valve opening and closing must be instantaneous . . . Jenkins SWINGTITE Fast-Action Bronze Gate Valves are setting new standards of performance and endurance.

The exclusive rolling disc and guide track design in the new Jenkins SWINGTITE distributes the wear, assuring maximum tightness (since it prevents uneven wear of seating surfaces), and lengthens valve life.

Use the SWINGTITE wherever fast-action valves take a beating on your processing lines. Compare it for long life and low maintenance. Prove for yourself that day after day it opens freely for full flow, and, closed, it seats tight and *stays* tight.

Ask your Jenkins Distributor for the folder, Form No. 196, describing the SWINGTITE in detail. Or write: Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros., Ltd., Montreal.

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AND IN SUCH APPARATUS AS

Laundry machinery
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Gasoline and fuel oil lines on motors, burners, etc.
Fire extinguishing steam lines

ONLY THE SWINGTITE HAS IT—

ROLLER ACTION

As the valve is opened or closed, guide rims (A) around the seating surfaces of discs roll freely over guide tracks (B) cast in the body, distributing wear evenly, dislodging foreign matter, and providing a polishing action for seating surfaces. This rolling disc and track construction lengthens valve life and assures maximum tightness.

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LOOK FOR THE DIAMOND MARK
VALVES
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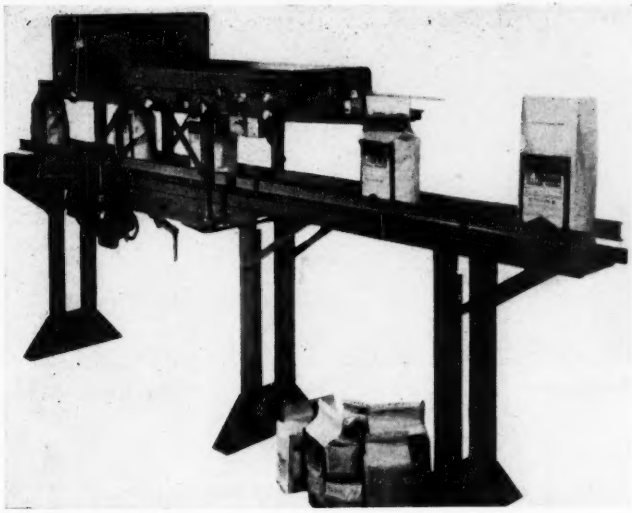
Closes Many Types of Paper Bags



Square and flat paper bags are double-folded, heat sealed and glued in this semi-automatic closing machine. Any product requiring a sift-proof closure where the finished bag top does not have to be glued down against the contents can be handled.

First operation is double folding. Then the inside of the bag is heat sealed. Finally, the second fold is glued to the first fold. Operation is continuous and no reciprocating or cyclic motions are employed. Reason it's only semi-automatic is tucking and pre-forming of bag gussets are manual.

Speed is determined by the number of bags that can be preformed by hand on a conveyor moving at 20 fpm. The conveyor can carry 200 lb.—*George H. Fry & Co.,* 169 *Front St., New York* 7.

Circle 125A on Reader Service Card

Demineralizer Operates From Water Tap

Of value to small quantity water users is a new, inexpensive demineralizer stated to offer chemically pure water for but a few cents per gallon.

By attaching the unit, known as the Demon, to an ordinary water tap, the user can, it is reported, produce up to 120 gal. of water per cartridge. Used are resins that change from blue to yellow as they become exhausted.

As water passes through the demineralizer, metallic and other ionic solids are removed from solution by mixture of anion and cation exchangers. Fiberglas filters help trap physical impurities. Even if quantity of dissolved salts is high, unit will, it is said, reduce concentration to less than .01 ppm. Amberlite resins, developed by Rohm & Haas Co., are utilized in this monobed deionization process.—*Enley Products, Inc.,* 254 *Pearl St., New York* 38.

Circle 125B on Reader Service Card

Germicide Used in Mop Improves Sanitation

Application of a new type germicidal product in the dust mop used for daily maintenance is claimed to make for better sanitation and to prevent multiplication of contaminants.

Called Antiseptic Huntolene, it is basically a highly refined dust-laying distillate. Product rinses out of mops and cloths in soap and water, leaving them clean, sanitary, and absorbent for re-use.

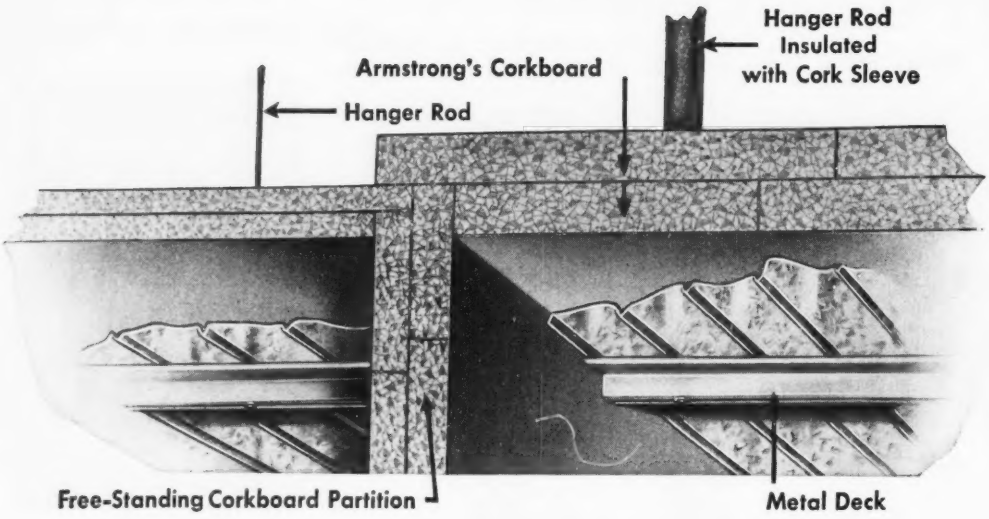
Product is sprayed into mop head, which is then allowed to stand for 24 hr. Treated mop will not become an "incubator" for germs, and it will not spread filth across floor.

The distillate keeps dust out of air and on floor for easy pick up. Soapy water, maker states, breaks up emulsifiable germicide and floats it and dirt out of mop. Sample of product is available on written request.—*Huntington Laboratories, Inc., Huntington, Ind.*

Circle 125C on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then turn to the Reader Service Section inside the back cover, where all are listed by pages and by subjects under, "Editorial: New Equipment, Supplies"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items that interest you, sign at the bottom, and mail. No postage is needed.



WE HAVE BEEN ASKED:

"What is the best way to join a free-standing cork partition and a metal deck?"

"We are specifying a metal deck ceiling in a 20° below zero freezer and an adjoining 35° anteroom," writes an architect. "The design calls for a free-standing cork partition between these two rooms. Just how should I join the partition and the metal deck?"

The illustration above shows the method Armstrong advised. As you can see, the metal deck is broken so that the cork partition can pass through and tie right into the cork ceiling insulation.

If you were to run the deck through both rooms and just butt the partition against it, the metal would get so cold in the 35° anteroom that condensation and frost would form on the deck adjacent to the partition. This condition will result in considerable loss of insulating efficiency at this point and in accumulation of moisture and unpleasant conditions in the anteroom as well.

When you're hanging the deck, leave a gap in it so that the free-standing wall will join the corkboard ceiling. The gap should be approximately 1" wider than the thickness of the insulation specified to allow ample clearance for putting up and finishing the partition.

Furnishing the right answers to questions on low-temperature insulation problems is just one of the services offered by Armstrong engineers. The complete contracting organization they represent also supplies top-quality insulation materials and skilled workmen to apply them. When you need advice on low-temperature insulation, call Armstrong.

SEND US YOUR QUESTIONS: If you have any questions on the use of insulating materials or the construction of low-temperature facilities, please do not hesitate to write to us. We'll see that you get a practical answer. Just address a letter or post card to Armstrong Cork Company, 2309 Concord Street, Lancaster, Pa.

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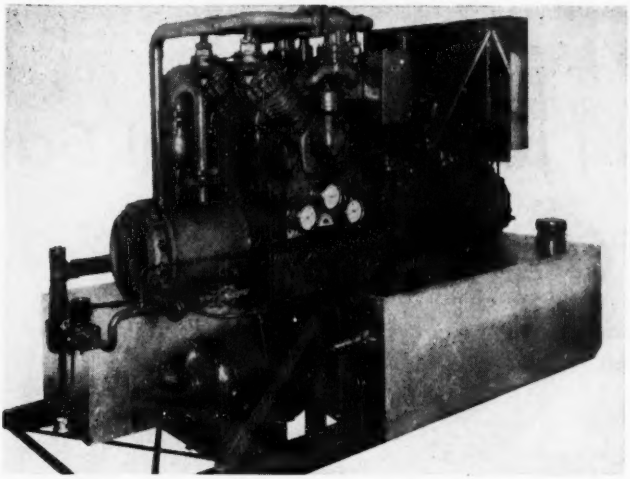
FOR ALL TEMPERATURES FROM 300° F. BELOW ZERO TO 2800° F.

Compact Cooling Unit Is Complete Package



Entirely self-contained, this new industrial water or brine cooling unit is ready for operation when connected to water and supply lines.

One pushbutton controls continuous, automatic supply of recirculated chilled water or brine at temperature and volume required.

Unit is designed for heavy duty cooling. It includes a high head, high volume water circulating pump, storage tank and complete auxiliary equipment assembled on permanent steel skids that eliminate necessity of any foundation or bolting down. Compact enough to clear through standard doors, and it can be easily re-located. Its job application is diversified within rated capacity.

Operation is on either gravity or pressure water return without an additional pump, and unit automatically adjusts to variable load and flow. Temperature range is adjustable. There are eight sizes, with refrigerating capacities ranging from 3 to 150 tons. —*Mayer Refrigerating Engineers, Inc., Rutherford, N. J.*

Circle 127A on Reader Service Card

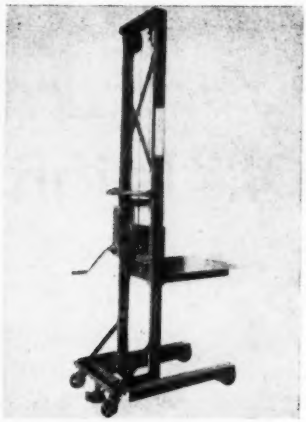
Plastic Drum Liners Are Strong, Flexible

Unusual ruggedness and flexibility are reported for a new copolymer plastic film material recently developed. It is now being used by many chemical, processing and packaging companies for various types of drum liners and bags. New copolymer products are made and shipped without DO ratings.

These drum liners and bags are electronically welded and tested. They are made in all sizes and shapes for practically every kind of steel or fiber drum, carton or case.

The maker's special container department also engages in specification contract welding on other plastic films—applying special technics that company has developed in fabricating "Kel-F", Polyvinyl alcohol, and Orlon. —*Protective Lining Corp., 22 E. 17th St., New York City 3.*

Circle 127B on Reader Service Card



Portable Elevator Has 7-Ft. Lift

For utilization of higher working areas, this 500-lb.-capacity portable elevator has a full 7-ft. lift.

Unit is a standard model, manufactured on a production basis. Use of the elevator increases the height to which materials can be piled, and is in keeping with the current trend to make more complete use of overhead space. It also gives the unit a greater range of usefulness for overhead and ceiling repairs.

Applications for these units include: Stacking of materials, serving storage racks, loading and unloading motor trucks, holding long or awkward work pieces for machines, and overhead maintenance jobs. — *Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Circle 127C on Reader Service Card

Geiger Counter Gage Measures Tin Plate

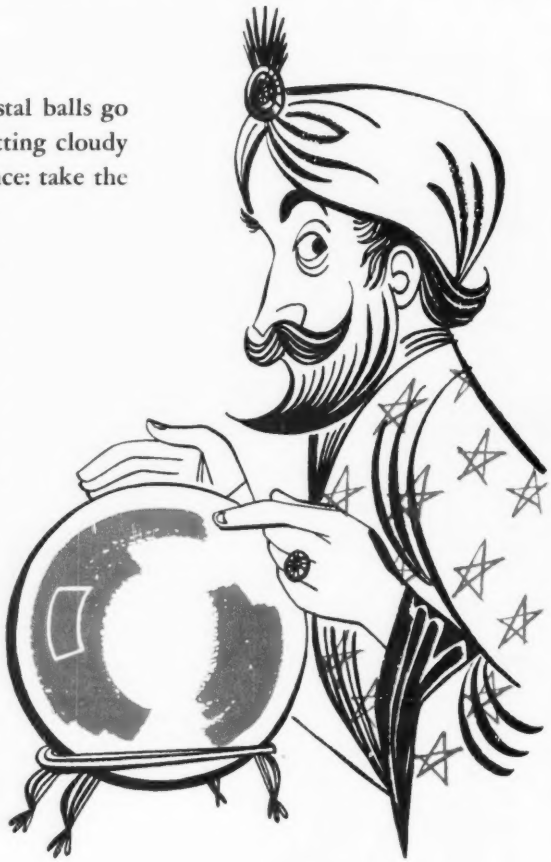
Tin coatings are now being precisely measured with a new X-ray Geiger counter gage. The instrument is termed speedier and more accurate. And at the same time, the tin plate is not marred.

A fine margin of less than 6 ten-millionths of an inch (0.0000006 in.) is stated to have been demonstrated by this gage. Adaptable to measuring various tin coating thicknesses for different kinds of cans, it is said to be capable of measuring coatings with a precision of approximately 1 percent.

The stock from which cans are formed is sheet steel, especially selected and rolled for the purpose. In the hot-dip method, each sheet is plated by

FOR SALE!

One (slightly used) Crystal Ball



Not a bad crystal ball . . . as crystal balls go . . . but lately it has a habit of getting cloudy when we need it most. For instance: take the case of VISQUEEN* film.

As you probably remember, VISQUEEN film was originally developed for the specific use of the armed forces. What they wanted was a polyethylene film such as had never been seen before . . . strong, durable, chemically inert, flexible and all the other qualities you know so well . . . a film that would meet rigid specifications yet be economical to use. *They got it!* And now, like many another reserve . . . VISQUEEN film is being called back to active service.

And that's our problem. While our Defense requirements get bigger and bigger . . . our customers delivery will of course dwindle. So we searched our crystal ball. And the only thing we could find is that we will have to ask you to please be patient . . . we're working hard, and we'll work harder to make every effort to fill your orders. You may be cut down . . . but we promise we will do the best we can to get VISQUEEN film to you.

*T.M. The Visking Corporation

IMPORTANT!

VISQUEEN film is all polyethylene, but all polyethylene film is not VISQUEEN. VISQUEEN is the only film produced by the process covered by U. S. Patent No. 2461975. Only VISQUEEN film has the benefit of the research and extensive technical experience of The Visking Corporation, pioneers in the development of polyethylene film. Be sure. Always specify VISQUEEN film for superior tear and tensile strength and greater uniformity.

VISQUEEN Film . . . *A Product of*

THE VISKING CORPORATION

PRESTON DIVISION • TERRE HAUTE, INDIANA

In Canada, Visking Limited, Lindsay, Ontario

dipping it in molten tin. Alternatively, in the continuous process, the plating is done by electrolytic action. Then the sheets are sheared to length. In either case, conservation of tin requires that the thickness of the coating be carefully controlled.

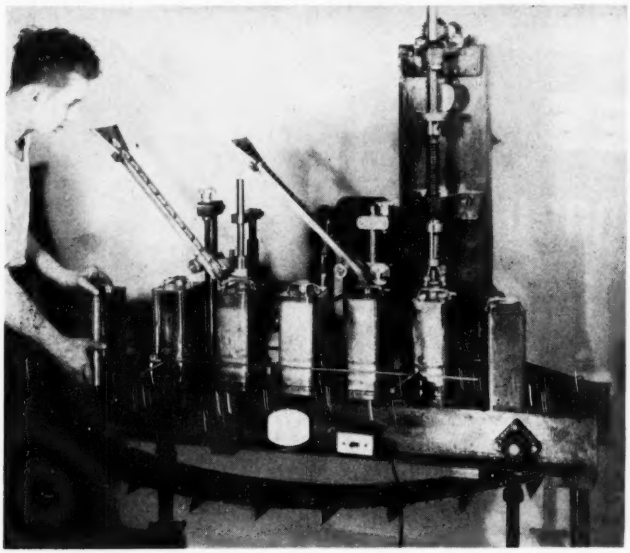
To obtain closer control of hot-dipped coatings, the laboratory scientists turned to a combination of modern devices—the industrial X-ray and the Geiger counter. Measurement of the tin coating is made by exposing a sheet of plate to an X-ray beam for a short interval and, at the same time, measuring with a Geiger counter the secondary rays reflected by the steel beneath the tin coating.

The tin traps some of the secondary X-radiation. That which reaches the counter has been found to be in inverse proportion to the thickness of the tin coating.

In the tin mills, measurements of minute coating thickness are made simultaneously on both sides of a tin plate sheet. The sheet is placed on a table between two X-ray units, one above and one below the sheet. A button is pushed to start the gages. Thirty seconds later, the gages shut off automatically. The precision readings of coating thickness are printed on moving paper tapes.—*United States Steel Corp., Office of Chairman, New York City.*

Circle 127D on Reader Service Card

Unit Automatically Caps, Bands 21 Cans per Minute



Upressit caps and tamperproof over-seals are reported capped, banded, and the bands crimped, at the rate of 21 cans per minute by this new automatic capper.

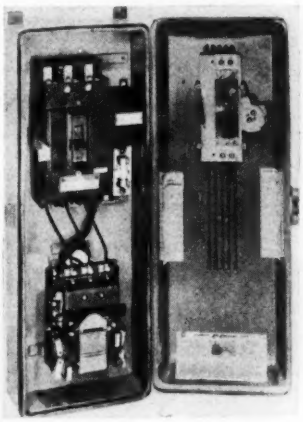
In operation, caps slide down chute (left in photo) and are applied as cans move along conveyor belt (right). Bands come down chute (center) and are crimped by rotating crimper (right).

Unit is fully automatic, except for manual loading of cans, caps, and bands. Machine will handle all sizes from 1-pt. to 2-gal. cans. Capper, constructed entirely of steel, is fully equipped with ball and roller bearings. Power is furnished by a ½-hp. standard or explosion-proof electric motor. Of simple design, capper is easy to adjust and lubricate. It is 6-ft. 6-in. in length and 6 ft. in height with a width of 40-in. Weight is 659 lb.

Eight cans are carried by the conveyor belt, which consists of two 4½-in. smooth chain belts, connected by a series of lugs that act as centering points under the feed chutes and sealing devices. Traveling chain belt is mechanically timed with action of vertical closing devices, and it moves intermittently only after each action of feeding and closing operation is completed.

Compact and portable, machine is fitted on legs that can be varied in height to suit filling operations. Closure seals airtight, preventing loss from leakage and staleness.—*Upressit Products Corp., New York City.*

Circle 129A on Reader Service Card



New Starter's Enclosure Gives Added Protection

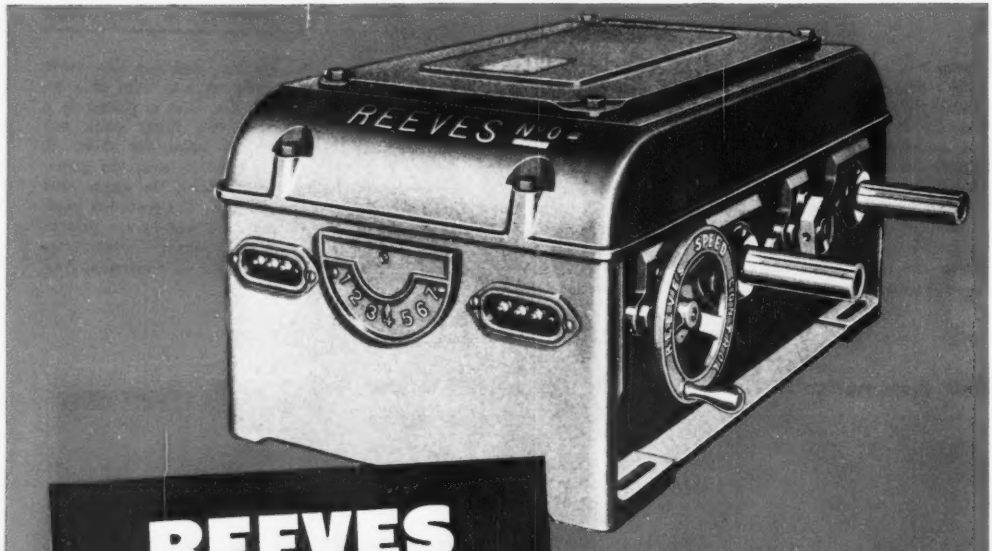
Improved starting and control of presses, and other equipment, is provided by the new Combination Life-Linestarter (Class 11-206-NJ).

Unit is available in NEMA sizes 1 through 5, with ratings up to 200 hp., 440-v. polyphase.

To keep out dirt, oil, and splashing coolant, the starter's NEMA type 12 enclosure has a continuous Neoprene gasket and is mounted by external brackets—no knockouts or mounting holes in the box itself. Breaker is operated by a slam-proof, self-indicating external handle, but the enclosure must be opened to reset overload relays, which brings motor overload to authorized person's attention.

Starters are furnished as standard with a 220/440-v. primary, 110-v. fused secondary, control circuit transformer that can be used on either 220-v. or 440-v. supply voltage, 50 or 60 cycles. —*Westinghouse Electric Corp., Pittsburgh* 30.

Circle 129B on Reader Service Card



REEVES Variable Speed Transmission

The original, mechanically correct unit for providing complete, stepless speed adjustability.

Industry's most widely used unit for adjusting machine speeds . . . for all these good reasons:

1. Incorporates the REEVES operating principle—proved in 300,000 installations—which assures *accurate, positive* delivery of any desired speed within the entire speed range, without stopping the machine.

2. Makes "changeovers" easier—utilizes the machine's *full* capacity—by providing the *right* speed—with the turn of handwheel or touch of button—for every operation and every operator, under every changing condition.

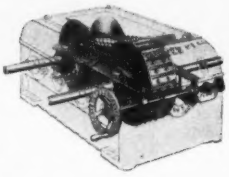
3. Wide choice of vertical and horizontal models—capacities up to 87 hp; in speed ratios of 2:1 to 16:1; manual, electric, hydraulic or completely automatic controls; suitable for mounting in any position. Also "Internals" for mounting within machine framework.

4. Easily installed on your machines. Ruggedly constructed with few moving parts subject to wear . . . requires no special tools or training to maintain.

5. Used on more different kinds of machines in a greater variety of industries than any other single variable speed drive.

Profit from REEVES Speed Control in your plant—*see immediate results.* Send for full details on REEVES Speed Control—ask for catalog No. FE68-G.

Operating Principle



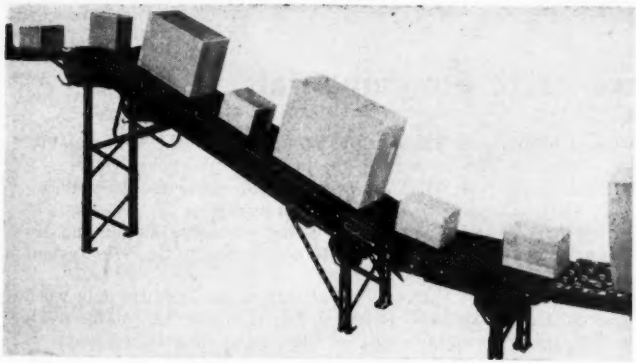
REEVES Variable Speed Transmission embodies the proved operating principle of a V-belt driving between two pairs of cone-shaped discs, mounted on parallel shafts and adjustable to form an infinite number of driving and driven diameters. One shaft receives power at constant speed from motor, line shaft, etc. Other shaft delivers power at infinitely variable speeds to driven machine. Each speed setting is held without fluctuation. Operation is practically noiseless.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized leader in the specialized field of speed control engineering

accurate • variable
REEVES *Speed Control*

Power Feeder Handles Long and Short Packages



Many types of packages can be transferred from level to inclined conveyors and vice versa with this new power feeder.

Connecting to the low end of a Floor-Veyor, Jr., unit adds to the inclined power belt conveyor's usefulness by handling very short or long articles that might not transfer smoothly from gravity feeders. Pitch of power feeder need not be adjusted when direction of flow is reversed. This saves set-up time when operator receives and ships on the same line.

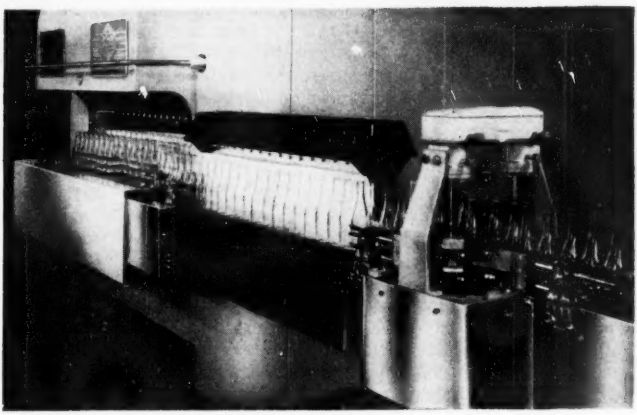
Feeder, manufactured in two widths to fit 10-in. and 16-in. belt units, may be attached easily to models already in use. Standard overall length of feeder is 30 in., with longer models available to fit special handling problems. A slotted connector bar allows the unit to be hooked to a gravity wheel conveyor (see illustration) for line use.

Chain-driven from the take-up pulley in the main conveyor frame, feeder's entire drive assembly is enclosed for safety. Take-up slides, with screw adjustment, provide an easy way to keep the belt aligned and at proper tension. The 4-in.-dia. welded-steel drive pulley, lagged for belt traction, is fitted with self-aligning pressure-lubricated ball bearings for smooth operation and long life.

Unit is furnished with adjustable, full-length, steel-channel guard rails and Ruff-Top belt.—*The Rapids-Standard Co., Inc., Rapistan Bldg., Grand Rapids, Mich.*

Circle 131A on Reader Service Card

New Unit Provides Easier Inspection of Empties



This new empty bottle inspector is offered in both single and double models for placement in bottling lines at a point between the washer discharge and filler (as illustrated).

Installation is readily accomplished by bracketing to the conveyor line.

Single inspector can accommodate washers that are 16 bottles wide. Larger unit utilizes a double line operation for bottle washers in excess of this capacity. Both units have an overall length of 42 in.

Light source is provided by a battery of fluorescent tubes which, combined with a curved, non-glare reflector of white background, permits more efficient inspection and reduces operator fatigue. Highly polished stainless steel reflector plate enables inspection of the crown ring for possible chipping.

Reflector housing and facing skirt panel are of black-cracked finish, avoiding possible glare. Main housing is of all-welded steel construction.

Single inspector handles all three bottle sizes, with double unit available for split and pint size bottles.—*The Liquid Carbonic Corp.*, 3100 *S. Kedzie Ave., Chicago* 23.

Circle 131B on Reader Service Card

Heat Transfer Units Come Ready for Use

A new standard line of electrical Dowtherm heat-transfer units has been developed. These units, supplied complete with instruments, piping, insulation, and other accessories, are ready for immediate use upon delivery.

With capacities ranging from 100,000 to 500,000 Btu. per hr., these heaters have a temperature range to about 750 deg. F. using Dowtherm as a liquid or vapor medium. Other heat-transfer fluids may be utilized in this equipment.

Entire unit may be base-mounted at factory or supplied with essential equipment for customer's own mounting.

Transfer units include a special heating element, designed to eliminate thermal breakdown or coking troubles. —*Struthers Wells Corp., Warren, Pa.*

Circle 131C on Reader Service Card

In Behalf of Progress . . .

Times Call for Adherence to Fundamentals

If you are not confused and a bit worried about chemicals in foods, you are a phenomenon Certainly enough confusion and cause for concern has been engendered by Delaney's witch-hunt, his alarmist article in a popular magazine, by the unbiased Food & Drug hearings, and by the honest defense of new chemicals by their manufacturers.

All this was topped off by a tentative not-for-publication statement by the unofficial but respected Food Protection Committee. This statement, which may be modified, expressed the opinion that the data available on the toxicity, tolerance, metabolic fate and nutritive value of surface active agents are insufficient to permit final judgment as to their safety when used in foods. Subsequently, the Committee explained that it had not intended to question the continued use in foods of surface active materials that are permitted now by currently existing or officially proposed standards of identity.

If after all this you can predict the import of future ice cream standards, final bread standards or an amended federal law, you are indeed a master-mind.

In view of the uncertainty and confusion about developments which will affect nearly all food processors, now is a good time for the industry to be guided by a basic code covering its responsibilities. We suggest the following:

1. If it isn't in some way good for consumers, don't do it.

2. The first requirement of a food is that it be entirely safe to eat.

3. The nutritive values of a food should be equal to, or better than, the product's traditional values.

4. Food processors should constantly strive to improve food quality in all its aspects.

5. Improved processing, packaging, storage and distribution methods should be used to the fullest extent to improve quality.

6. Unusual ingredients should be added only when the same beneficial results cannot be obtained economically by the better methods mentioned above.

7. At the same time, food processors should evaluate, without favor or prejudice, each new ingredient that promises to improve quality, or to cut cost without impairing quality.

8. Management should keep its fingers on the pulse of public likes, dislikes and doubts, and act accordingly.

9. So-called "plus" values should not be put into a product if these must be obtained at the sacrifice of more important basic qualities.

10. Food advertising should not make virtues out of shortcomings. If it does, it will mislead and confuse the public in respect to basic values.

11. Processors should not be stampeded by zealots or alarmists. Consumers know that processed foods are not poisonous, and that a balanced diet is the only way to get all necessary food values. Also, most of them still select food on the basis of taste.

All this can be summed up by saying: Let your conscience and common sense continue to be your guides.

Neophytes Set Example in Food Processing

We recently had the pleasure of eating in New York quick frozen breaded shrimps packed by a new small company in Georgia. Although the executives of this company came from the newspaper business, their shrimps were excellent. And here's why:

Having written many newspaper articles about fishery operations, the president of the firm knew that there was room for improvement. Being a good reporter, he pried into all sources of information on how to effect the improvement. And he utilized top-notch technical men to put advanced ideas and knowledge into commercial operation.

The new plant handles each shrimp, or other seafood, as a unit. Take the production of breaded fantail shrimps as an example: Iced shrimps are rushed from the boats to the plant and quickly shelled, deveined and cleaned under fresh running water. While still cold, each shrimp is pinned by the tail onto a stainless steel rack. Next, the shrimps are dipped quickly into a milk and egg batter, and machine dusted with cracker meal. Then they are placed into a —50 deg. F air-blast tunnel.

Hard frozen in a few moments, the shrimps are packed into consumer cartons and go back into a freezer room, still as separate, individual units.

The consumer puts the shrimps directly into hot deep-frying fat without separating or thawing them. And the quality is comparable to that of the fresh-caught product.

These shrimps cost more than some competing products. And though indications point to plenty of sales, the management is out to reduce processing expenses, and price.

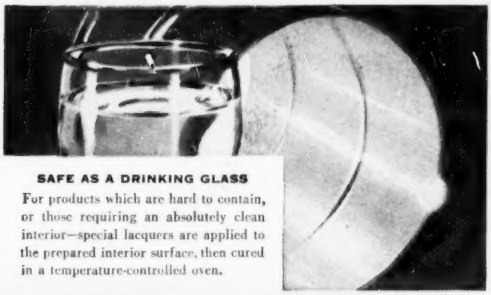
Other food processors might well profit from an inspired do-it-better-and-more-efficiently attitude like that of SeaPak Corp., St. Simon's Island, Ga.

WORLD'S FIRST COMPLETELY LITHOGRAPHED AND INNER ROLLER-COATED 55-GALLON STEEL DRUM

Rheem R

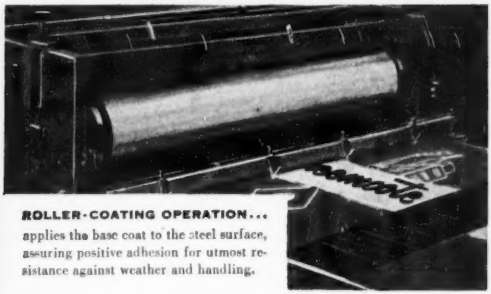
BIG CONTAINERS NOW "TRAVELING BILLBOARDS"

Consider the merchandising opportunities this remarkable new package presents! The durable and lustrous finish of Rheemcote drums, lithographed with *your* distinctive colors, trademarks and designs, will billboard your product and name before the eyes of the world.



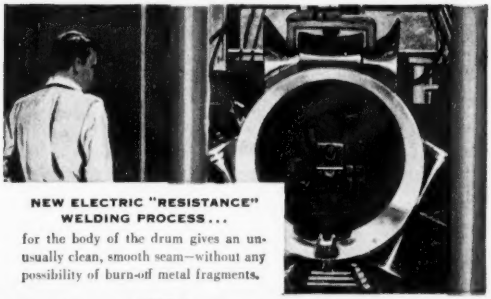
SAFE AS A DRINKING GLASS

For products which are hard to contain, or those requiring an absolutely clean interior—special lacquers are applied to the prepared interior surface, then cured in a temperature-controlled oven.



ROLLER-COATING OPERATION...

applies the base coat to the steel surface, assuring positive adhesion for utmost resistance against weather and handling.



NEW ELECTRIC "RESISTANCE" WELDING PROCESS...

for the body of the drum gives an unusually clean, smooth seam—without any possibility of burn-off metal fragments.

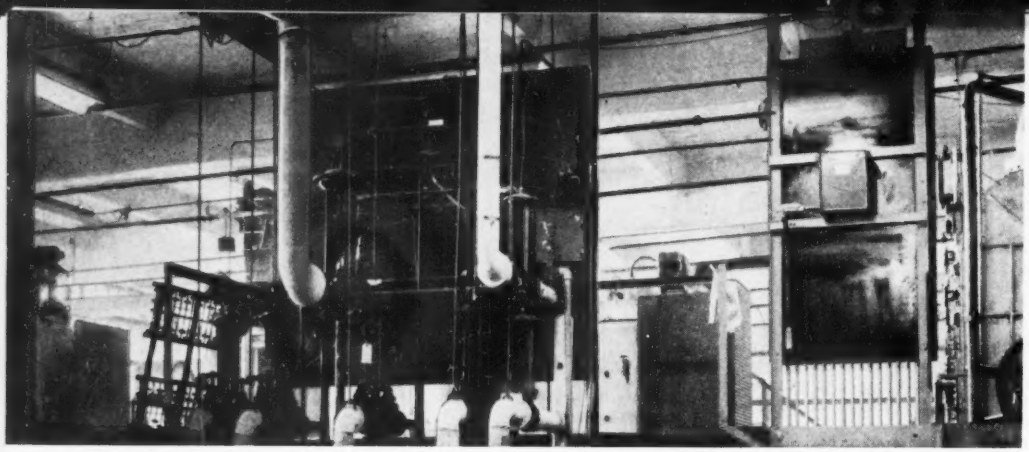
After many years of research, the Rheem Manufacturing Company, world's largest maker of steel shipping containers, is proud to have developed the Rheemcote Process in this, its 25th year of service to industry.

For a *free*, descriptive, beautifully illustrated brochure on this important contribution to marketing—write or wire Rheem today.

Rheem R

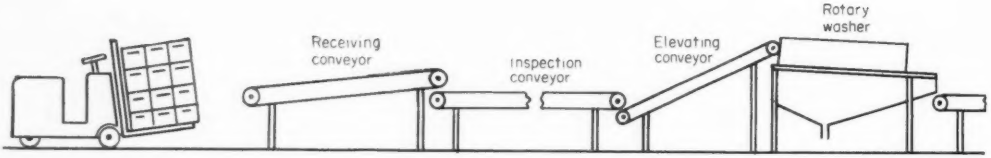
RHEEM MANUFACTURING COMPANY
570 Lexington Avenue, New York 22, N. Y.
Plants and Affiliates Throughout The World

Rely on Rheem to Deliver Your Goods..and Goodwill



VIEW (rear) of controls. Process conditions are regulated from panel on left. Electrical devices (right panel) mastermind the operations to make processing "robot" as well as continuous.

FRUIT PREPARATION



Robotized Jam, Jelly, Preserve Line

Successive Mechanized Operations — Key-Point Photos

THROUGH use of control instrumentation and automatic ingredient proportioning, jam, jelly, marmalade, and preserve making has been robotized by the Reich Continuous Process—to the extent that only one mechanic and assistant are required to attend the equipment.

All are processed (see accompanying foldout) in three 2-stage units: 1. Juice preheater and sugar mixer and dissolver; 2. vacuum evaporator and pectin mixer; and 3. inversion tank-pasteurizer and discharge regulator. Auxiliary equipment, ingredient make-up mixers, proportioning pumps, meters and control instruments contribute to or control the major step operations.

Capacity of the smallest continuous assembly is 30,000 lb. per 8-hr. day, while the largest units produce 120,000 lb. Greater capacity is obtained by multiple assemblies.

Either fresh or frozen fruits can be processed into any of the four end-products—jam, jelly, marmalade, or preserves. Same equipment is used for all. Shifting from one product to another requires but 30 min. (the time it takes to clean all processing units).

When jam or jelly is processed, the fruit is heated in cookers, passed through pulpers, and standardized before entering the preheater-dissolver unit. Cooking and pulping are omitted when making marmalade or preserves.

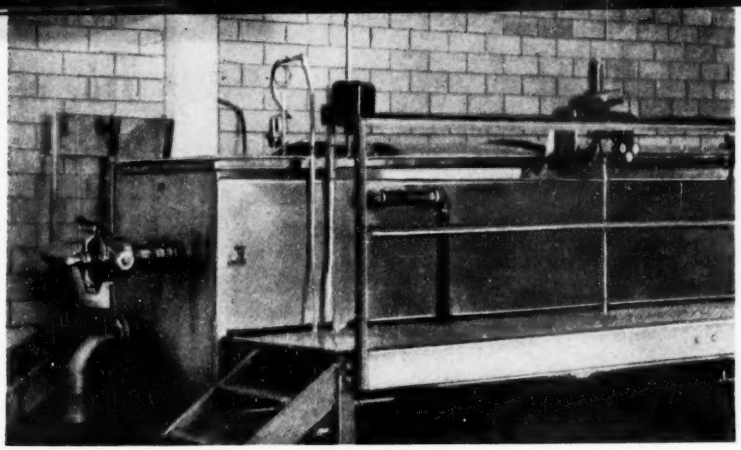
Heat exchange in the preheater—Point (1)—is effected, by contact with jacketed screw conveyors. Temperature, brought up to 140 deg. F., is instrument controlled.

Mixing proportioned sugar with the product is done in the last section of the preheater-dissolver. If bulk sugar is used, it is proportioned by weight. Liquid sugar is added by a positive displacement pump or meter. Finger-like stirrers in this section of the unit prevent sugar from settling and assure a uniform brix.

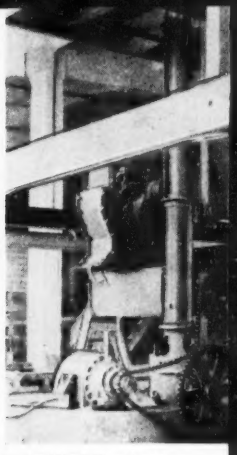
Two processing steps are accomplished in the vacuum evaporator,—Point (3) to which the product flows next.

What Makes It Tick

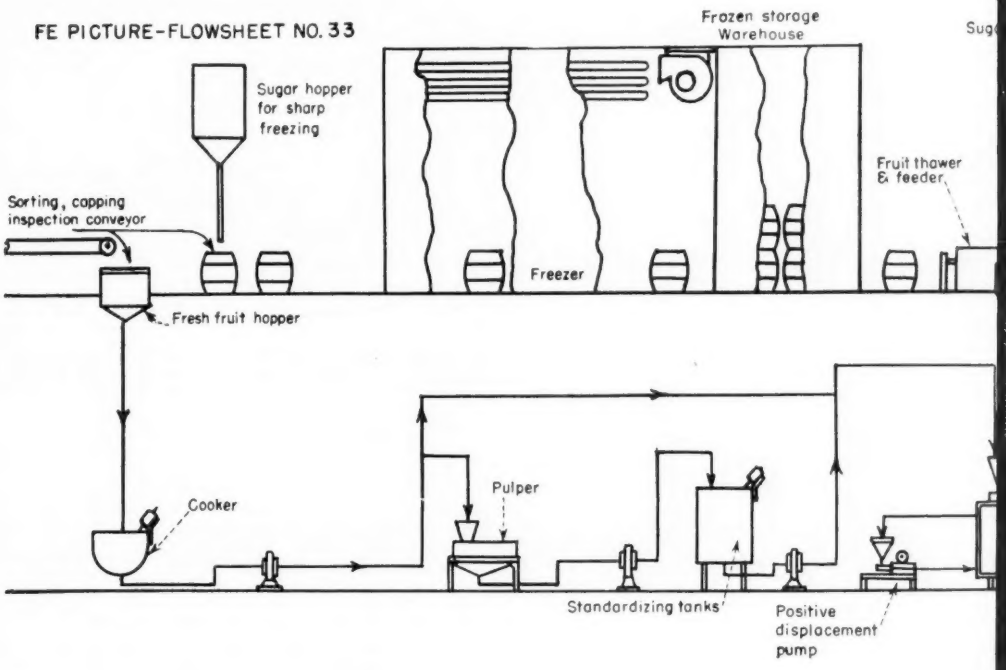
For the detailed story behind this Reich process—design of units, prime points of operation, and advantages derived—see the special article, "Mechanized Continuous Process Pays Six Extra Benefits," page 103.



1 **PREHEATER-DISSOLVER** raises juice temperature to 140 deg. F. in first section of unit, dissolves and uniformly disperses sugar in last section.



2 **GRINDER** pulverizes sug
ors take it to hopper.



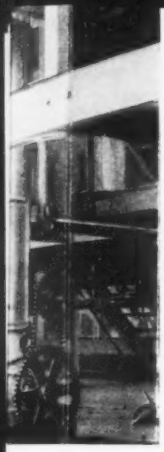
Through evaporation under 26 in. vacuum at 125 deg. F., the product is concentrated to the desired consistency. This predetermined concentration is controlled by density regulating instrumentation. Incorporation of pectin also occurs in this unit, the pectin solution being added by proportioning pump and mixed with the product by rotating steam-heated paddles.

In the first section of the last unit,—Point (7) — sugar is inverted by addition of acid and an increase of the temperature to 180 deg. F. Acid flow to the tank is controlled by pH instrumentation. Increased temperature not only speeds inversion but also pasteurizes the product and reduces the viscosity sufficiently to permit easy filling into containers. From the inversion tank, the product passes into a holding compartment. It is then proportioned out of the tank to the filling machines by a master regulating valve and shut-off. This control provides uniform distribution of the solids and syrup in the various finished products.

Normal time of flow through the equipment is 40 min. Rate is uniform and continuous. In the event of motor failure or human blunder, electrical controls automatically take over, shutting off steam to all units, interrupting current to all motors, and thus halting processing until the faulty condition is corrected.

The heating, adding sugar, evaporating, incorporating pectin, inverting with acid and heat, and pasteurizing are the same in this continuous method as in the batch process. Difference is in manner of operating and the results.

In the continuous method processing is uninterrupted, therefore maximum volume is produced per unit of equipment. All operations are mechanically performed and instrument controlled, hence errors resulting from manual control are avoided. Greater uniformity of product is assured, and waste is eliminated.



zes sugar. Convey-
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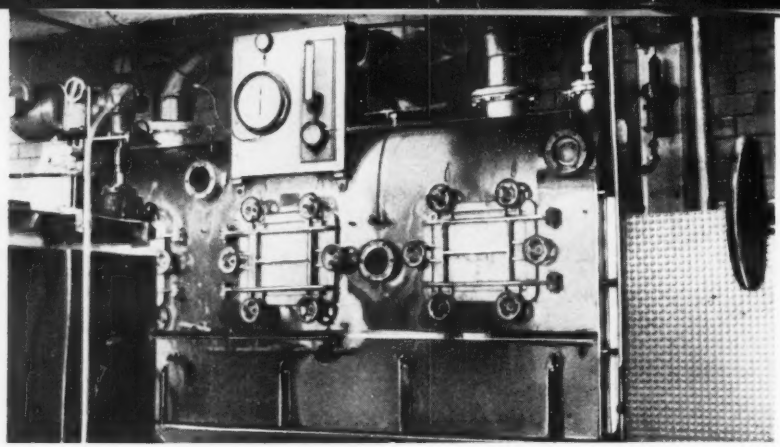
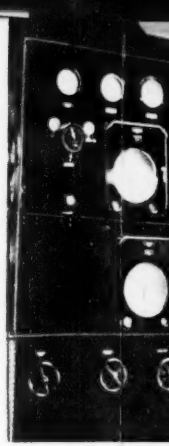


3 EVAPORATOR, at 125 deg. F. and 26 in. vacuum, concentrates product-base to required consistency. Here, pectin is added and impregnated into fruit.



4 INSTRUMENTS
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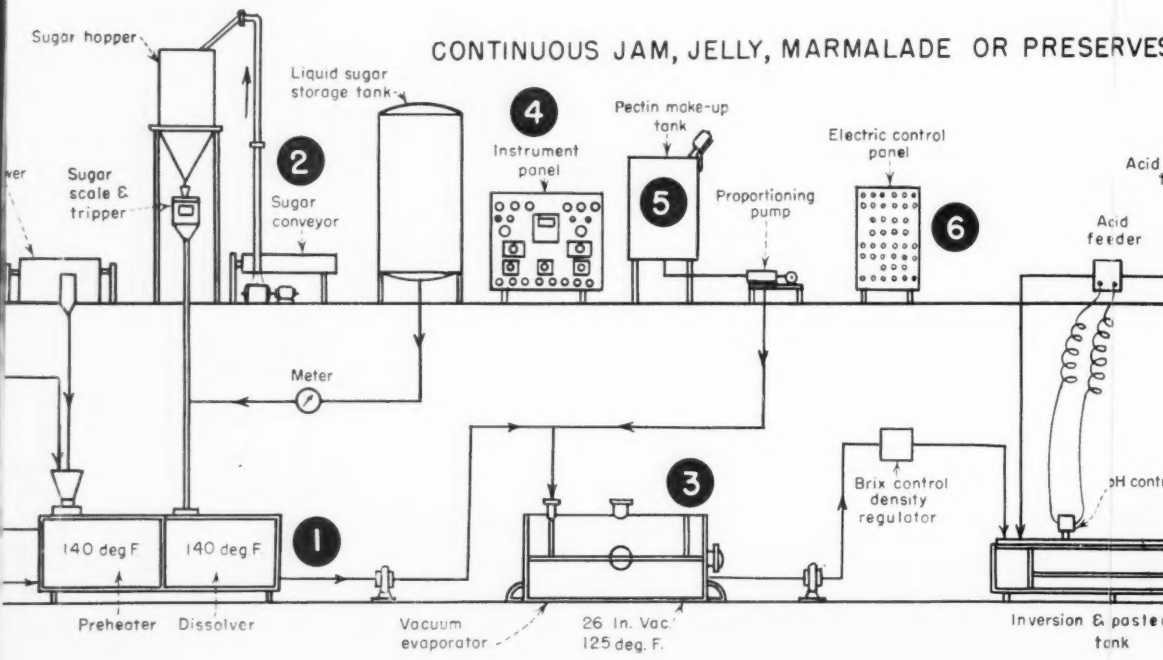
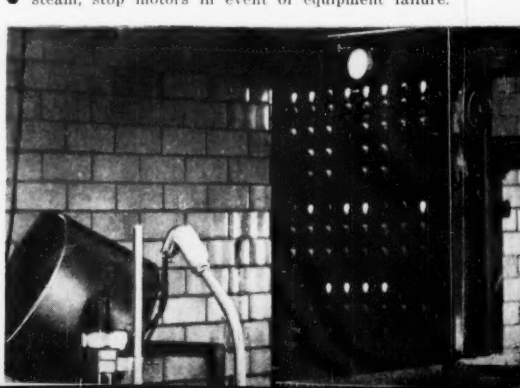
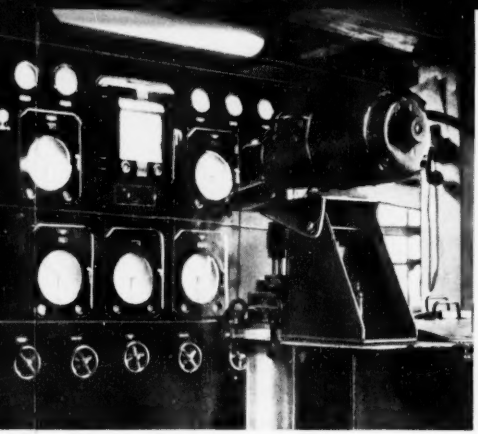


5 MAKE-UP TANKS for pectin, jacketed and of stainless steel, are mechanically agitated. Rear tank is for acid.

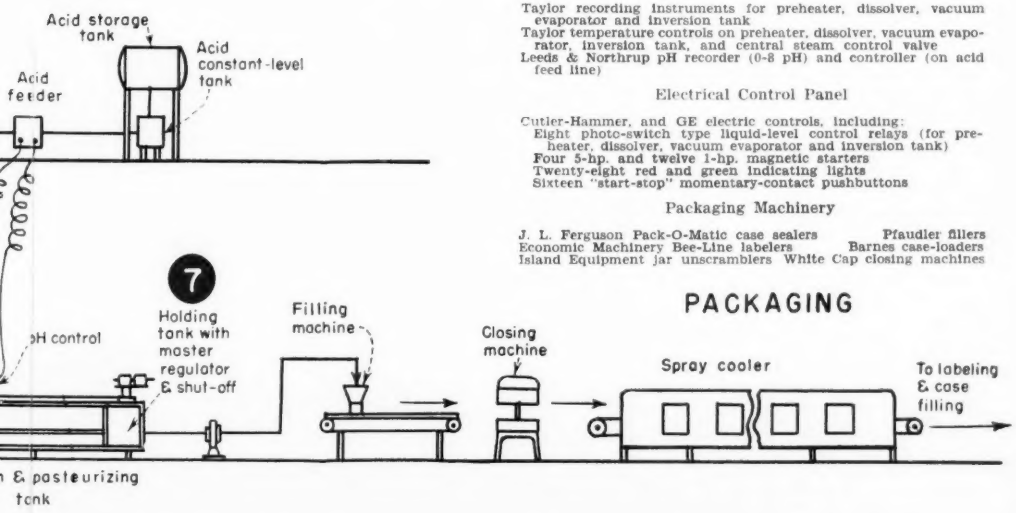
6 COLORED LIGHTS on electrical panel indicate motors in op
steam, stop motors in event of equipment failure.





UMENTS on panel indicate and record pH, vacuum, res, and temperatures in respective processing units.

SERVES PROCESSING



notors in operation. Controls shut off e.

LIST OF EQUIPMENT

Preparation Equipment

Automatic Transportation, Clark Equipment, Baker-Raulang industrial power trucks
Standard Conveyor, Lamson, and Rapids-Standard belt conveyors
Link-Belt and Stephens-Adamson screw conveyors and elevators
Baker Ice Machine refrigeration compressors (for sharp freezing and frozen storage)
Chicago Stainless Equipment preparation vessels
Langsenkamp pulpers & finishers — Worthington pumps
Century Electric & GE motors — Food Machinery fruit washers
American Blower (on freezer blast) — Crane valves & fittings

Major Processing Units

Gustave Reich equipment, including:
- 200-gal. stainless fruit pump tank, with discharge control valve
- 300-gal. stainless, jacketed, steam-coil agitated preheater, 3-hp. motor drive
- Special design preheater discharge valve
- 380-gal. stainless, jacketed, mechanically agitated dissolver
- 500-gal. jacketed, stainless vacuum evaporator, with agitator driven by 3-hp. motor

Evaporator discharge valve, ½-hp. variable speed motor
- 360 gal. stainless, jacketed inversion tank, equipped with 3 horizontal stirrers, driven by 3-hp. motor
- 116-gal. stainless, jacketed holding tank, equipped with motor-driven master discharge regulating valve

Auxiliary Processing Equipment

Schutte-Koerting barometric condenser
Groen, Struthers-Wells, and Lee Metal Products stainless steel tanks and kettles
Cherry-Burrell and Tri-Clover sanitary valves and fittings
Waukesha, and Waterous sanitary pumps
Edtbaur Duplex Automatic net weigher, feeder and counter
Mixing Equipment Lightnin, and Eastern Industries mixers
Bin-Dicator high-low level controls
Elgin Mfg. Duplex feeder, driven by ½-hp. motor
Hills-McCanna positive displacement pumps
U. S. Electrical Motors, and Master Electric variable-speed and gear-head motors
Barry-Wehmiller spray coolers — Crane valves & fittings

Instrument Control Panel

Taylor recording instruments for preheater, dissolver, vacuum evaporator and inversion tank
Taylor temperature controls on preheater, dissolver, vacuum evaporator, inversion tank, and central steam control valve
Leeds & Northrup pH recorder (0-8 pH) and controller (on acid feed line)

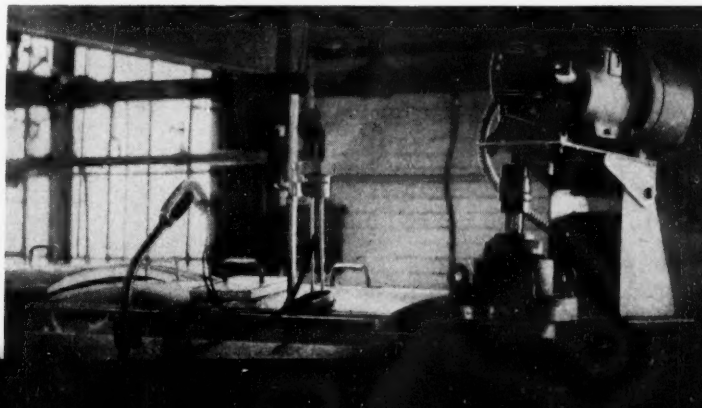
Electrical Control Panel

Cutler-Hammer, and GE electric controls, including:
- Eight photo-switch type liquid-level control relays (for preheater, dissolver, vacuum evaporator and inversion tank)
- Four 5-hp. and twelve 1-hp. magnetic starters
- Twenty-eight red and green indicating lights
- Sixteen "start-stop" momentary-contact pushbuttons

Packaging Machinery

J. L. Ferguson Pack-O-Matic case sealers — Pfaudler fillers
Economic Machinery Bee-Line labelers — Barnes case-loaders
Island Equipment jar unscramblers — White Cap closing machines

7 SUGAR is inverted to needed amount by pH-controlled tank (left). Fruit and syrup are uniformly proportioned by motor-driven valve (right).



3 Good Questions...

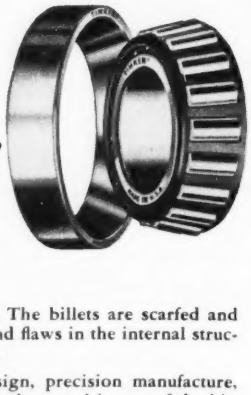
Why do TIMKEN® bearings take heavier loads and have longer life?

Why do TIMKEN bearings resist wear and retain precision longer?

Why are TIMKEN bearings more uniform in their high quality?

One Good Answer—

THE TIMKEN COMPANY MAKES ITS OWN STEEL!



THERE are several good answers to the questions above. But one of the *basic* reasons for the superior load capacity, wear resistance, and uniform high quality of Timken® bearings is the fact that the Timken Company makes its own steel. And the Timken Company is the only bearing manufacturer in America that does!

Having its own steel-making facilities enables the Timken Company to carry on research and development in steels that results in constant improvement in quality. It also permits complete control of the product—from melting through final inspection.

The high quality of Timken steel begins in the melting of selected scrap. Correct chemical composition of every heat is insured by use of the direct-reading spectrometer, new scientific instrument for analyzing a heat of steel in a matter of seconds. Even after the steel is in billet form, quality safeguards continue. The billets are scarfed and chipped to prevent cracks and flaws in the internal structure of the finished product.

Along with advanced design, precision manufacture, and rigid quality control, Timken steel is one of the big reasons why it pays to always look for the trade-mark "Timken" on the tapered roller bearings you buy. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

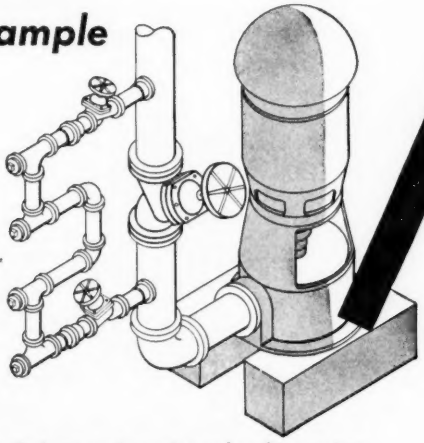
TIMKEN TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◐ AND THRUST ◐ LOADS OR ANY COMBINATION ✳

for outstanding service

on Corrosive Well Water

..for example



...e Installation—
...arr Rubber Products Co.,
...andusky, Ohio

PROBLEM: To eliminate costly seating and packing maintenance, and frequent replacement of valves on plant well-water pump. Valves previously used highly unsatisfactory, having maximum life of 6 months.

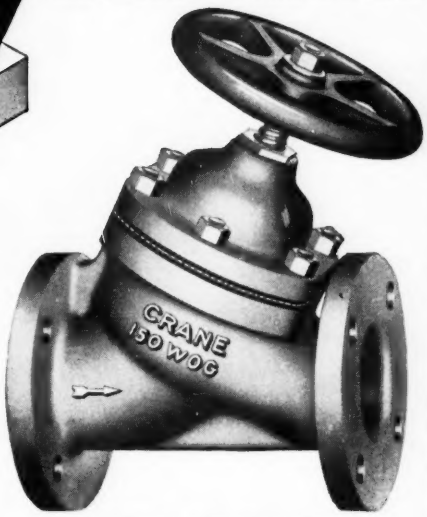
WORKING CONDITIONS: Sulphur content of water extremely high. Valve constantly exposed to severe corrosive and erosive effects. Operated infrequently; yet easy operation, positive seating are prime requisites.

SOLUTION TO PROBLEM: Crane Packless Iron Body Diaphragm Valves featuring separate disc and diaphragm design. Three-inch No. 1611 flanged end valve on main discharge; ¾-inch No. 1610 screwed end valves on by-pass.

RESULT: While other valves lasted only 6 months or less, Crane Diaphragm Valves show no effects of service, after more than a year. They operate smoothly . . . seat tightly . . . no maintenance whatsoever needed to date!

Another typical demonstration of superior quality, and the low-cost performance of Crane Valves. That's why . . . More CRANE VALVES are used than any other make!

...Choose Dependable CRANE VALVES



No. 1611 Crane Iron Body Diaphragm Valve —one of a full line suited for many services. Literature on request from your Crane Branch or Crane Wholesaler.

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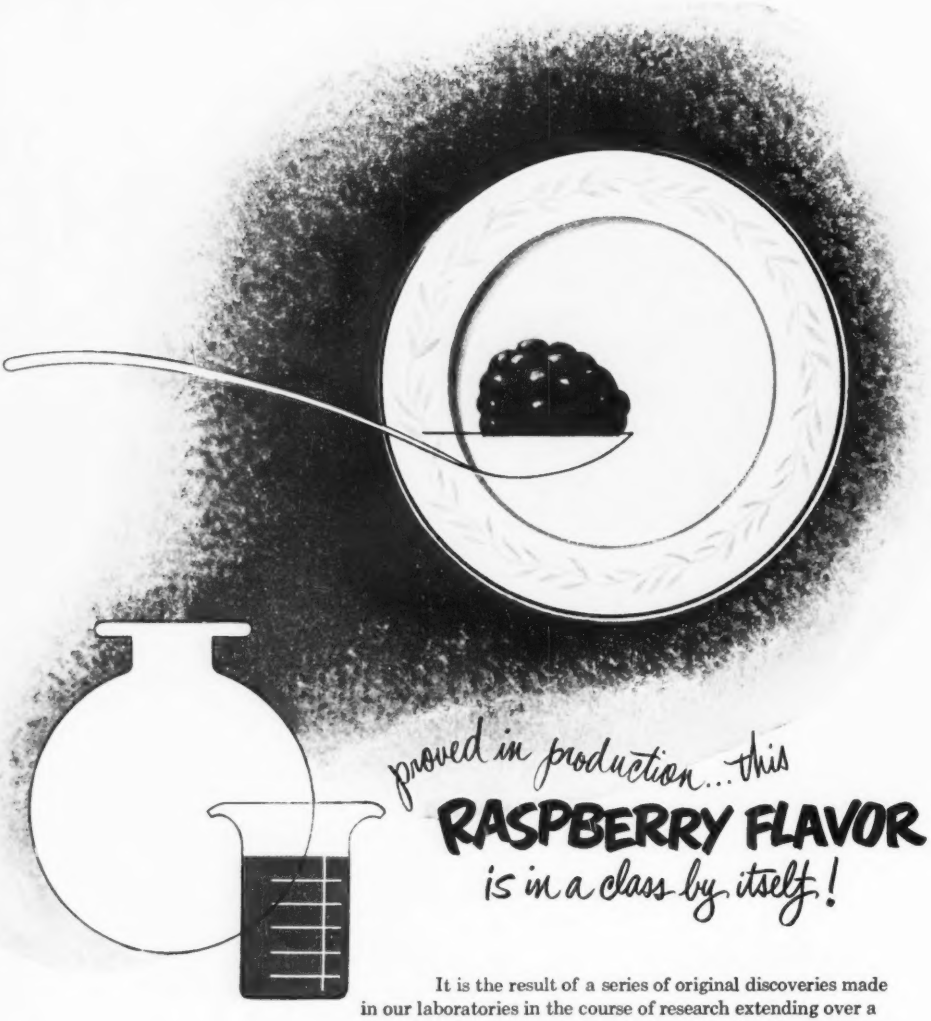

proved in production... this

RASPBERRY FLAVOR

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It is the result of a series of original discoveries made in our laboratories in the course of research extending over a period of many years. For the first time the flavor alone of sun-ripened raspberries has been lifted with absolute precision and converted into a tremendously powerful flavor material with physical characteristics specialized for commercial uses. Its absolute uniformity is the result of completely controlled, synthetic construction. Its sure, solid raspberry flavor is the result of systematic research and exact knowledge.

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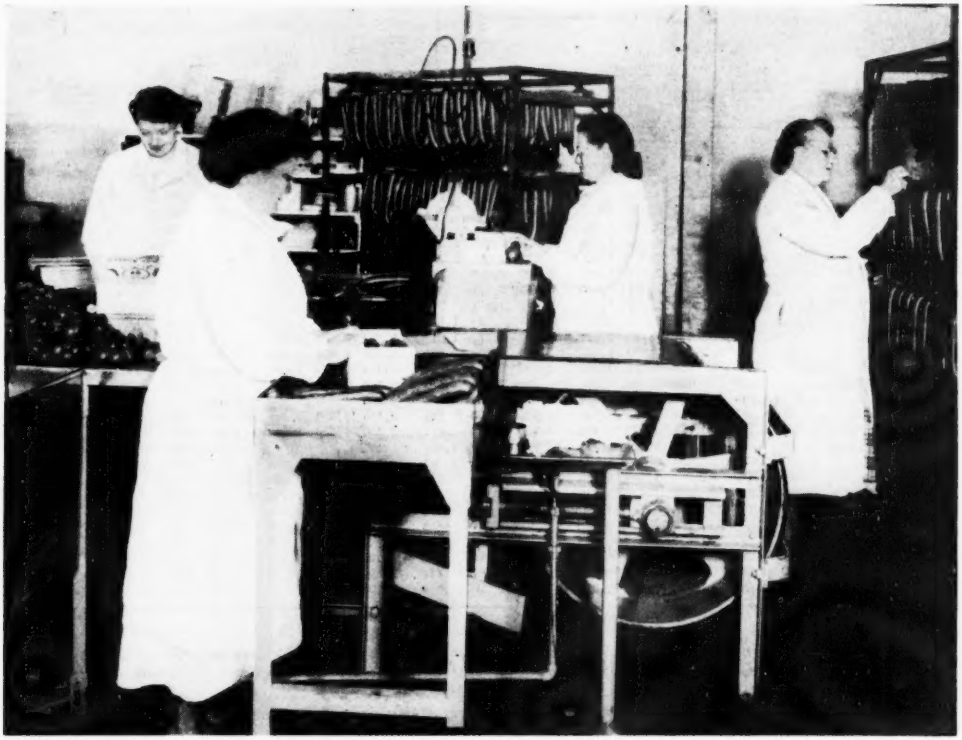


EVER-FRESH products at lowest manufacturing cost is requirement at A&B. Here, ring bologna is being packaged.

"How Can I Gage Output to Meet Seesawing Sales?"

Production Control Is the Answer

For this variety sausage packer, it was triple-headed problem: What to make, how much, and when? Solution lay in carefully calculated scheduling—in short, getting down to business with the calendar

W. C. ZINCK
Plant Manager,
Arbogast & Bastian, Inc. Allentown, Pa.

Through a system of analyzing sales and scheduling production of sausage products, Arbogast & Bastian, Inc., long-established meat packer with a reputation for quality products, has derived four benefits:

1. **It has assured shipment of fresh products on all orders.**

2. **Eliminated, for all practical purposes, being "out" of a product—orders are shipped complete and they are taken with a firm understanding between salesman and retailer.**

3. **Scheduled production of all sausage items in economical lot amounts.**

4. **Kept total inventory at the very minimum, with lowest overall production cost.**

When a housewife buys a ring of bologna, a package of scrapple, or a pound of fresh sausage, she expects them fresh. Hence, the retailer must have them fresh from the sausage maker to insure maximum shelf-life.

To get top freshness at lowest production cost has been the constant aim of this sausage maker. Accordingly, he manufactures in economical batch lots, working to avoid both heavy losses from week-end carry-overs and also the hazards of running short of a product.

Furthermore, the problem of keeping retailers constantly supplied with fresh products is tied into the eating caprices of the consumer.

The whole problem is tough.

Pleads the sausage maker to the

THIS IS TYPICAL A&B Record Covering Inventory, Output and Sales of Ring Bologna

4-wk. Periods	1	2	3	4	5	6	7	8	9	10	11	12	13
1951	39,533	40,534	43,386	32,839	33,083	32,865	.....	.....	.....	.....	.....	.....	.....
1950	36,411	32,305	36,986	34,345	32,907	33,079	41,254	42,932	50,624	46,727	51,647	43,733	39,812
1949	27,115	26,325	27,986	25,897	25,167	29,125	32,697	39,767	46,227	46,852	48,810	42,572	38,836

	MONDAY			TUESDAY			WEDNESDAY			THURSDAY			FRIDAY			SPECIAL	
Week Periods	Inventory	Made	Sold	Inventory	Made	Sold	Inventory	Made	Sold	Inventory	Made	Sold	Inventory	Made	Sold	Made	For
1. 10–30–50..	2,800	1,301	1,429	2,000	1,999	1,103	3,400	1,887	659	2,300	1,946	2,946	800	1,339	3,219	...	9,356
1. 11– 6–50..	500	2,003	1,483	600	2,923	1,347	2,475	3,100	719	3,300	1,374	2,598	1,000	1,345	3,698	...	9,845
1. 11–13–50..	700	1,360	1,544	475	3,344	1,475	2,825	1,993	550	2,000	1,925	2,755	825	1,280	3,829	...	11,697
1. 11–20–50..	275	2,700	1,169	1,150	2,666	1,966	1,775	1,968	1,936	.....	.....	.....	525	1,995	3,564	...	8,635
2. 11–27–50..	550	1,348	1,504	325	2,000	1,471	1,675	2,712	731	1,675	2,718	2,123	575	2,072	3,985	...	9,814
2. 12– 4–50..	825	1,966	1,669	975	2,009	1,665	2,000	2,789	521	1,400	2,666	2,996	900	1,392	3,731	...	10,572
2. 12–11–50..	700	2,073	1,326	1,000	2,605	1,800	2,875	2,630	624	2,175	2,000	3,067	1,025	2,074	3,183	...	10,000
2. 12–18–50..	1,200	2,700	1,544	2,625	2,050	1,321	3,375	2,050	703	2,625	2,000	2,660	1,450	2,605	3,920	...	10,148
3. 12–25–50..	.....	.....	.....	1,075	2,700	2,265	2,275	3,350	1,436	1,050	4,150	4,003	300	3,402	6,401	...	14,105
3. 1– 1–51..	.....	.....	.....	600	2,700	1,901	900	2,710	1,210	1,200	4,050	2,681	1,970	1,407	3,949	...	9,741
3. 1– 8–51..	1,150	1,364	1,699	950	2,000	1,448	3,225	2,700	495	1,850	2,050	2,888	1,350	1,395	3,325	...	9,855
3. 1–15–51..	475	2,000	1,435	975	2,074	1,328	2,300	2,700	631	1,725	1,985	2,929	1,525	1,850	3,362	...	9,685
4. 1–22–51..	1,125	1,380	1,229	1,200	2,000	1,334	2,300	2,700	405	3,150	2,000	2,425	1,650	1,372	3,111	...	8,504
4. 1–29–51..	1,400	2,000	1,249	2,875	2,000	1,047	4,200	2,700	402	4,150	1,350	2,302	2,800	.....	2,694	...	7,694
4. 2– 5–51..	1,550	2,000	1,147	2,400	1,350	1,162	2,825	2,700	311	3,125	1,350	2,290	2,150	662	2,993	...	7,903
4. 2–12–51..	1,025	2,000	1,258	1,625	2,133	1,292	3,350	2,036	471	2,350	1,350	2,632	1,200	1,333	3,085	...	8,738
5. 2–19–51..	1,050	2,618	1,443	1,275	2,013	1,480	1,975	2,070	1,857	.....	.....	.....	750	647	3,630	...	8,410
5. 2–26–51..	.....	2,700	1,069	1,400	2,000	1,178	2,425	2,000	597	2,150	1,350	2,604	525	1,315	2,669	...	8,117
5. 3– 5–51..	300	1,974	1,359	1,250	2,000	1,036	2,850	2,000	576	2,430	1,325	2,214	1,175	1,327	2,811	...	7,996
5. 3–12–51..	725	1,392	1,350	340	1,437	1,489	1,300	2,700	603	2,150	2,000	2,282	1,000	1,296	2,836	...	8,560
6. 3–19–51..	675	1,325	1,187	925	2,700	1,039	2,800	2,700	525	3,100	1,350	2,163	1,760	1,417	2,133	...	7,047
6. 3–26–51..	.....	.....	.....	2,275	1,929	1,222	3,500	2,000	856	3,100	1,350	2,303	1,950	1,307	2,465	...	6,846
6. 4– 2–51..	1,975	1,964	1,077	1,675	1,350	1,458	2,225	2,000	587	1,325	2,023	2,635	800	1,966	3,325	...	9,082
6. 4– 9–51..	425	2,000	1,598	1,100	2,700	1,442	2,900	2,700	788	2,725	2,700	2,715	2,350	2,066	3,347	...	9,890
7. 4–16–51..	2,200	1,350	1,617	1,850	2,700	1,588	3,925	2,000	641	2,550	2,663	2,975	1,800	1,331	3,369	...	10,190
7. 4–23–51..	1,550	1,311	1,556	1,275	2,700	1,571	2,550	2,700	685	3,900	2,700	3,135	1,600	1,305	3,302	...	10,249

sales manager: "Can't you come any closer in figuring out how much I should turn out?"

And the sales manager likely replies: "How can you expect sharp estimates when the retailers' sales vary all over the lot—day to day, and week to week?"

Thus, judging what to make, when, and how much has always been a headache to the manufacturer.

Tackling the Problem

This age-old sausage-production control problem was encountered head-on by the writer in the course of his job of streamlining operating routines of Arbogast & Bastian, Inc. Its solution was developed via the scientific method of getting all data.

There were three factors: First, it was necessary to determine how much of each product was actually sold each day of the week. Here, the company's accounting system, using I.B.M. punch cards, made it easy to get the figures for the separate products. For each product, the sales for any specific day of the week proved remarkably constant from week to week, with clearly discernible seasonal trends up or down according to the time of year.

Accompanying table shows a typical sales record for ring bologna. It is seen that an available 1,650 lb. of ring bologna is ample for shipment on a Monday. But 3,500 lb. are needed for Friday and only 800 lb. Wednesday.

So far so good.

And now to the second factor: How could enough be kept on hand to fill each day's orders with fresh products where daily sales vary 400 percent within the week? And how could economical batch-lot manufacture be maintained for the 40-odd different products?

Left-Overs Inventoried

Actually, a bench mark that always existed at A & B is daily inventory. After each day's orders had been filled, sausage products left over in the sales-packing cooler were reported. Also recorded were products that had been made but which, say, still required chilling and branding before delivery to the sales-packing cooler. In general, good sausage practice is to ship the day following actual production.

To keep down labor costs—the final factor—the sausage maker had to be advised the day before just what he must produce on the following day. This is necessary for efficient requisitioning of cures from stores and of fresh meats from boning departments.

It's the Old Dilemma

Production Foreman: "Can't you come any closer in figuring out how much I should turn out?"

Sales Manager: "How can you expect sharp estimates when the retailers' sales vary all over the lot—day to day, and week to week?"

Furthermore, crews must be scheduled to operate grinders, mixers, silent cutters, and stuffers.

The production-control problem was now reduced to knowing: (1) What was on hand at the start of a specific day and what was expected to be sold that night against it, (2) what was scheduled to be made today and what was expected to be sold tomorrow night against that, and (3) how much should be scheduled to be made tomorrow against what was expected to be shipped the night after tomorrow night.

The step-by-step analysis that solved this enigma was not found on the first try, nor the second. But it was eventually found.

Way System Works

Following figures show just how it worked out for the ring bologna. For example, on Friday, April 20, there were 150 lb. of ring bologna in the sales cooler and 1,100 lb. in the sausage room. Thus, there were 1,250 lb. available for shipment Sunday night against Monday's orders. From past sales on Mondays, it was estimated that 1,650 lb. would be shipped. With only 1,250 lb. available, there would be an "out" situation of 400 lb.—meaning that instead of some being left over after filling Monday's orders to be applied against Tuesday's orders, there wouldn't actually be even enough for Monday's orders.

However, there are some products

that can be shipped out the night of the same day as made and not be "too fresh" for best customer acceptance. Ring bologna is typical.

To continue with the analysis of ring bologna: There are 2,100 lb. scheduled to be made on Friday (as determined on Thursday). Thus, the Monday orders can be filled by taking fresh products directly from the sausage coolers. This then leaves 1,700 lb. of Friday's production of 2,100 lb. available for shipment Monday night against Tuesday's orders. The estimated sales for Tuesday are 1,650 lb. Therefore, Friday's production of 2,100 lb. can stand without any last-minute adjustment. The net result is 50 lb. available for shipment against Wednesday's orders.

Expected sales for Wednesday being 850 lb. means that at least 800 lb. must be made. The batch lot for ring bologna is 700 lb. Therefore, two batches are scheduled to be made on Monday to cover Tuesday night's packing of Wednesday's orders. With 3,000 lb. to go out the next night, the 600 lb. "over-run" is still excellent practice.

All these figures are recorded by the company on comprehensive sheets, where 54 sausage items are listed by products and sizes. Incorporated are 18 columns headed: Production, scheduled and actual; sales-cooler inventory according to how many days old (4, 3, 2, 1, and total cooler inventory); sausage-room inventory; overall inventory; next day's estimated sales; amount available for second day's sales; second day's estimated sales; production for second day's sales; amount available for third day's sales; third day's estimated sales; production for third day's sales, batch lot; and man-hours.

THESE employees work to careful calendar schedule to produce just-right amount of items to meet pre-calculated orders. From stuffing unit (right), frankfurter meat is stuffed into casing that is linked by machine (left).

Moreover, on these sheets items are coded x x x (meaning that they can be shipped the night of the day made) and 3 zeros over 3 "x's" (in smokehouse by noon if shipped that night).

Any special-event demand, as for a wedding feast, is taken care of by a special memorandum from sales to production control. Then so much extra production is called for and earmarked for such-and-such a truck route on such-and-such a day.

New Pea-Maturity Tester Called Handy Field Unit

Australian device eliminates need for power source . . . Ready cleaning speeds tests

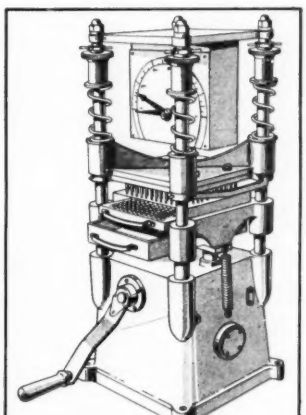
ADVANTAGES claimed for a newly developed test instrument for physical determination of pea maturity are light weight and independence from motive power sources —which make it readily adaptable to field tests.

■ **Determinations can be carried out at the rate of one a minute, operations being expedited by an automatic wiper that clears the sampling pins. Also, the bottom plate is easily removable for cleaning.**

Developed for the Australian canning industry by the Commonwealth Scientific & Research Organization, this "maturometer" (a form of tenderometer) is said to give good correlation with the standard chemical maturity method that determines the percentage of alcohol-insoluble solids in peas.

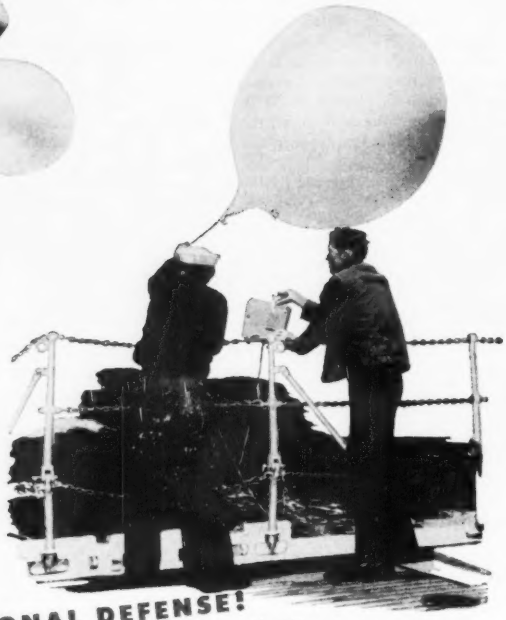
The new test instrument (see drawing) is essentially a puncturing device in which a large number of peas are simultaneously penetrated by a series of steel pins. Measurement of resistance to penetration determines the maturity of the peas. The pins, ⅛ in. in dia. and ¾ in. long, are set vertically to align with an equal number of countersunk holes in an aluminum plate.

With its maximum sample of 143 peas, the plate is moved upward by hand-operated worm gear and cam to contact the pins. Measurement of resistance to penetration is dependent on the resulting transmitted upward motion of the pin plate against four matched helical springs. This movement is then magnified. And maximum force exerted is indicated in pounds of pressure, by a reading pointer. The value thus obtained is expressed as the maturometer reading.



GLYCERINE

IMPORTANT FOR CONFECTIONS...



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"Versatile" is the right word for U.S.P. Glycerine! As a humectant, it preserves freshness and palatability in confections and foodstuffs. It's a solvent, sweetener, softener, and vehicle. It's easily digested and wholesome, with the same caloric value as carbohydrate. So valuable is this food constituent that most processors and confectioners agree:

"Nothing takes the place of Glycerine!"

Our defense planners agree, too—and as a result, Glycerine consumption has reached new heights. Because defense demands must be met, you may find your supplies restricted, temporarily. If this happens, remember: Our military efforts rely on Glycerine for the same unique combination of properties that makes it "first choice" with you.

GLYCERINE PRODUCERS' ASSOCIATION
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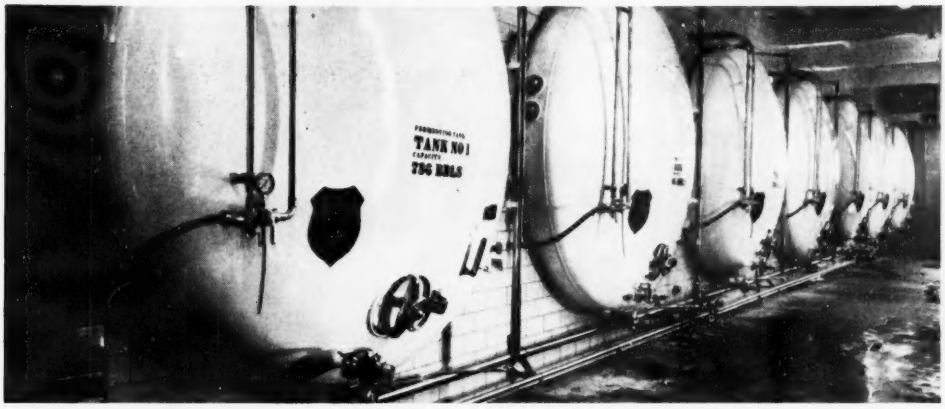
PROBLEM: Their Safe Support



ANSWER: Cushioned Hangers . . .

. . . And Lateral Braces

Ground Couldn't "Take It" So Tanks Are Suspended

Plagued by unstable strata under its new brewhouse, Coast company "hangs" big units, thus equalizing foundation pressures and minimizing differential settling

JUST WRESTLING with the job of safely supporting huge, steel brewhouse tanks is a plenty-tough problem. But that wasn't the half of it for San Francisco Brewing Co. engineers.

■ **They had to put 56 tanks over unstable, sinking soil!**

Here is the story: The company's new brewhouse was slated for erection on the only possible site—an area underlaid with a 51-ft. depth of sandy material composed of both loose and well consolidated strata. Below this was found a considerable thickness of soft blue clay typical of the San Francisco Bay area.

This clay is being squeezed into the Bay. And as a result the area is sinking at the rate of about 1 in. a year.

Unique Suspension Proves Answer

All the conventional ways of "carrying" the tanks were given the most careful examination. But every one of them was found wanting. Finally, however, the engineers came up with the solution—a special two-point suspension method of support.

Prime consideration in design was to equalize foundation pressures to minimize possibility of differential settling of the brewhouse. Also, no

(*Turn to page* 200)

MACK TRUCKS

See You Through

• There are many good reasons why a Mack is your best truck investment during times like the present. Most important of all is the undisputed fact that Mack trucks outlast them all.

This means that with a Mack truck you can face the uncertainties of the future with assurance…confident that even if trucks should become hard to replace your Mack will see you through…that it will stay on the job delivering dependable service mile after mile and year after year.

Thousands of truck users in World War II found out by actual experience that they were indeed "Lucky to own a Mack." Whatever the future may bring, you'll find that for a sound investment in long-term reliability and operating economy there's no other truck to match a Mack.

Your nearest Mack branch or distributor will give you the full story on what "Built Like A Mack" means in *extra* long life, *extra* strength and stamina, *extra* performance and *extra* dependability.

Mack TRUCKS

. . . outlast them all

Mack Trucks, Empire State Building, New York 1, N.Y. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Mack Model A-40T tractor-trailer combination operated by J. J. Kelly of Jacksonville, Fla. in over-the-road hauling of refrigerated foodstuffs.

Halved

Sliced

Dried

Then Ground and Screened Into Bright and Fragrant Product

Excellent Nutrient for Infants, Promising Flavoring for a Variety of Other Food Products Seen in—

Rich Powder From Papaya

GLADYS S. KING, HELEN SAKANASHI and ELLEN SONG
Hawaii Agricultural Experiment Station, Honolulu, T. H.

A dry fruit powder of fine flavor and notable for its content of pectin, minerals and vitamin C is now being processed from papaya fruit at the Hawaii Agricultural Experiment Station, Honolulu, T. H.

■ **Already a market has been found for the new powder as a supplement in infant cereals. And other likely uses are seen for it as a flavoring for beverages, ice cream, jellies, and other products.**

The Station developed the new powder technic when some 700 tons of surplus papaya still remained after demands for the fresh fruit and processed product had been met from Hawaii's annual yield of approximately 4,000 tons.

Immediate result of the surplus had been a price decline. Because of the overproduction, the average wholesale price per pound of Grade A papayas fell from 7.0c. in 1949 to 5.2c. in 1950, with the low for the latter year recorded at 2.9c. in November.

How It's Done

That situation posed the initial problem. But today the powder development is reported to be so promising that it is expected to carry considerably more potential than a mere utilization of the current surplus.

Moreover, there are broadened possibilities in the fact that papaya can be grown successfully in all tropical countries and readily processed into the new powder.

The method employed in preparing the powder, as carried out at the Station, is as follows: Whole ripe fruits, with seeds removed, are cut into slices 3/16 in. thick (peel included). Then these slices are spread on screen trays and dried (at temperatures not above 150 deg. F.) to a moisture content of 6 percent.

Finally, the dried slices are ground to pass through standard 20-mesh screens—giving the finished product a powder bright in color and retaining much of the fragrance of the fresh papaya.

Vacuum Drying to Retain "C"

Composition of the powder is outlined in the accompanying table, along with a comparative analysis of the fresh fruit prior to drying. As is seen, the only constituent undergoing significant change in drying is the vitamin C. The loss is slightly more than 75 percent. However, this deterioration in vitamin content can be minimized by use of vacuum drying, in which the loss is less than 10 mg. per 100g. of fruit, or 7 percent—yielding a powder with 1,050 mg. of vitamin C per 100g.

Yet even with air-drying the vitamin content of close to 25 percent certainly classifies the powder as a high-vitamin food product. And equally impressive nutritionally is the high content of minerals, protein, fat, pectin, and other carbohydrates.

The above article is taken from Technical Paper No. 232, published with the approval of the Director of the University of Hawaii Agricultural Experiment Station. Financial assistance for the study was provided in part by the Industrial Research Advisory Council, Project No. 2.

DRYING BRINGS NO Significant Losses—Other Than a Vitamin C Reduction, Which May Readily be Parried by Vacuum Drying.

Comparative Composition—Fresh Papaya (Seeds Removed) and Powder

	Percent In Fresh Fruit	Calculated to 6 Percent Moisture	Actual Values In Powder
Moisture	86.46	6.00	6.00
Ash	0.64	4.48	5.00
Protein	0.98	6.82	5.67
Pectin	0.76	5.92	5.75
Fat	0.18	1.33	2.88
Reducing sugars	8.89	61.90	63.65
Sucrose	0.11	0.77	0.00
Total sugar	8.99	62.60	63.65
Vitamin C	160.00*	1114.00*	243.00*
Carotene	0.36*	2.50*	2.80*
Water insoluble fiber	1.27	8.85	10.77

*Mg. per 100 gm.

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WORLD'S LARGEST SUPPLIERS OF VANILLIN

THREE of these 3,300-gal. units are leased by MSC to distribute liquid sugar over a wide area of Michigan.

Trucking of Liquid Sugar Is Fast and Flexible

Michigan Sugar Co. economizes by using limited common carrier in small-fleet operation serving area within 100-mi. of Saginaw

FOR MORE than a year the Michigan Sugar Co., Saginaw, Mich., has been using road tractors and tank trailers to distribute liquid sugar. The company employs a common carrier, delivering on a filed rate per cwt. of syrup.

Determining factor in the use of tractor-trailers, aside from the fact that railroad tank cars have been in short supply, has been the faster and more flexible delivery obtained.

Deliveries of liquid sugar are made to food plants producing ice cream, soft drinks, sweetened condensed milk, jams and jellies, and frozen fruits. The radius of delivery is approximately 100 miles, the most distant city served being Detroit.

The tank trailers are painted in the company's standard colors and lettered with its name and address, although owned by the limited common carrier. Thus in appearance the trailers are those of the Michigan Sugar Co., without any capital investment on its part.

The company initially considered purchasing, operating, and maintaining its own equipment, but after careful study it calculated that it was economical to have the deliveries made by an outside carrier.

Because of the labor-saving advantages to the food plants receiving the sugar in liquid form instead of bags, the motorized delivery method is becoming increasingly popular. The operation began in June, 1950, with one tractor-trailer, and a year later it had three similar tractor-trailer units.

One of the earliest sugar refineries to deliver liquid sugar in motor vehicles was Refined Syrups & Sugars, Inc. Its fleet, reported in June, 1945, *Food Industries*, consisted of 20 units, of which 8 were trucks and 12 were tractor-trailers. The advantage derived by Refined Syrup's customers from the truck delivery of liquid sugars remain the same today.

Much Easier Handling

In the liquid-sugar delivery method, operations are greatly simplified. Instead of the manual unloading of bagged sugar, delivery is made, mechanically, direct from the tanker to the food plant's storage tanks, thence by gravity or pump to processing.

Back in 1945, Refined Syrup's trucks of the six-wheeled or three-axle type carried 1,500 gal. tanks and the tractor-trailer units had tanks of 2,500-gal. capacity. The semi-trailers of the tractor units had one rear axle.

As compared with this earlier equipment, that used by the Michigan Sugar Co. consists entirely of tandem-axle trailers with tanks of 3,300 gal. capacity each. In the more sparsely-industrialized Michigan territory the legal 3,300-gal. tank unit best serves the company customers, with probability of a lower unit delivery cost because of the larger load carried.

Each tractor-trailer makes at least one trip a day. During the busy processing seasons, two trips a day are sometimes made, totaling eight or nine trips per week.

The vehicles are owned and operated by Albert Harmon, Caro, Mich. They consist of Fruehauf trailers and Ford tractors. By the use of a tractor-trailer unit instead of a straight truck, the tractor, carrying the Harmon name only, may be used on other hauls on those days when the liquid sugar deliveries do not require a full day's operations.

At the Michigan refinery, the liquid sugar is loaded at a temperature of 160 deg. F. Without insulation on the tank itself, the syrup retains enough of its heat to be delivered anywhere within the 100-mile distribution radius with no difficulties, even with the atmospheric temperature down to 0 deg. F.

Sucrose syrup of 67 deg. Brix will start crystallization at about 70 deg. F. But no trouble with crystallization has been experienced because this syrup retains its heat very well. On the other hand, the 76 deg. Brix invert syrup (55 percent inversion of sugar solids)

make every bit of stainless count

Wise and efficient use of available stainless steel stocks can go a long way to making sure that all defense and industry needs are met.

Getting the best available materials for your job is a vital first step—Crucible, pioneers in the development of stainless steels, urges you to take full advantage of our metallurgical staff and stainless fabricating specialists. Their wealth of experience—based on thousands of stainless applications—can help stretch your stainless supply. There is no other metal that can work the same "miracles" as stainless, and these Crucible metallurgists can help you select the best available stainless grades for your needs.

It's up to you to make every bit of stainless count—we're equipped to help you do it. When your problem is stainless—call on us.

CRUCIBLE first name in special purpose steels

51 years of Fine steelmaking

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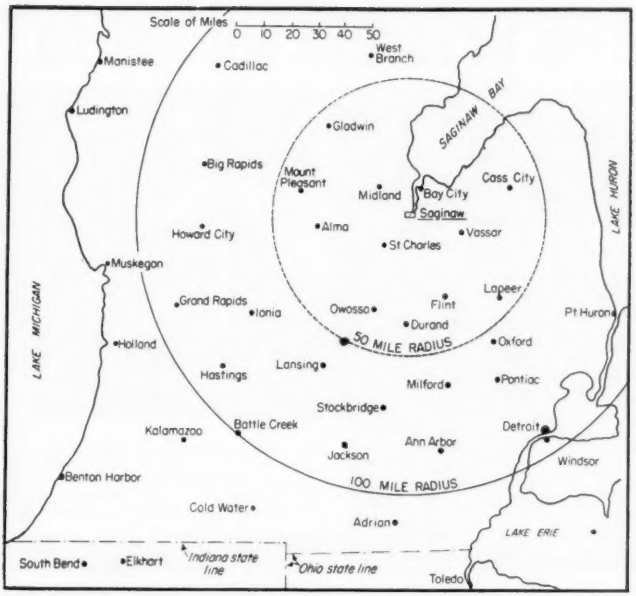

BIG RANGE OF DELIVERIES calls for one, often two, trips daily with large tankage. System contributes to lower unit distribution costs.

will not crystallize, though it becomes viscous as it cools.

The syrup is delivered under pressure at all customer food plants, even if the storage tank is below the level of the trailer tank and might thus permit a gravity drop. Pressure is used in such circumstances to reduce the time of delivery. Of course with the storage tank on the second (or higher) floor, pressure delivery must be used.

This pressure is provided by a small pump driven by a separate gasoline engine carried in a special compartment, with folding doors, below the trailer frame on the right or curb side of the vehicle looking toward the front. The pump, with a 2 in. discharge and 2 in. hose, is capable of delivering the syrup to a height of 100 ft. above the ground. The average tank unloading time is 20 min.

The trailer tank itself is of elliptic cross-section with a full skirting on both sides. Included on each side is a longitudinal hose compartment for carrying additional discharge hoses for use in cases where one section of hose cannot reach the storage-tank fill pipe.

Unlike the gasoline and fuel oil semi-trailers of the same general design, the liquid sugar trailers are equipped with no gallonage flow meters. The measurement of the liquid sugar or other syrups delivered is calculated by weight. The difference in weight between the loaded and the empty vehicle is the weight of sugar delivered.

The tank top is fitted with a catwalk. This walk has raised sides to prevent any spillage from running down over the sides of the tank and covering the lettering.

For access to the trailer catwalk at time of loading, the operator climbs the permanent iron ladder at the rear. The loading manhole has a gasketed cover with an air vent and a dust cap to prevent contamination.

For cleanliness, the tanks may be washed inside with hot or cold water. Unless the kind of syrup is changed, it is not usually necessary to wash the tank interior after each trip, but only occasionally.

The story of this company's operation offers another first-hand example of how food plants may use trucks to increase their businesses. Here, the example is unusual because of the special nature of the trailers and the fact that a limited common carrier is used instead of the refinery buying or leasing equipment for operation by its own drivers.

But at the start, with only three tractor-trailer combinations required, the company could not justify the establishment of its own automotive department. However, such a department may eventually be justified if the fleet is increased to more than ten units, usually the minimum at which company costs approximate or become lower than those of outside trucking specialists.

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are asbestos-protected

No motor is more durable than its windings. In *U. S. Uniclosed Motors* all windings are *asbestos-protected*. Motor life is tremendously increased because asbestos cannot carbonize and withstands highest temperatures.

Uniclosed Design

Beautiful contouring of the armored Uniclosed surface adds eye appeal and product sales advantage. Other U. S. features – Lubriflush lubrication, normalized castings, centricast rotors, dual ventilation.

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Send U. S. Uniclosed Motor Bulletin featuring asbestos-protected windings.

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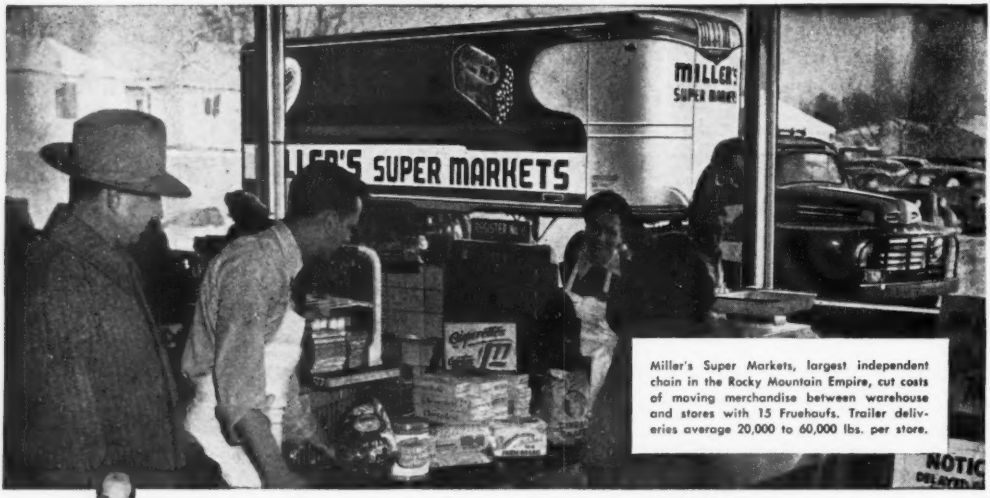
TRAILERS TRIM COSTS for TODAY'S BIG "SUPERS"!



Miller's Super Markets, largest independent chain in the Rocky Mountain Empire, cut costs of moving merchandise between warehouse and stores with 15 Fruehaufs. Trailer deliveries average 20,000 to 60,000 lbs. per store.

Paul Cohen, Supt. of Warehousing & Transportation, Miller's Super Markets

"WE MOVE TWICE AS MUCH... TWICE AS FAST... AT HALF THE COST... WITH TRAILERS"

"IN OUR OPERATION, every step taken to trim distribution costs enables us to pass extra savings on to our shoppers.

"We've *doubled the volume and speed* of our deliveries and *trimmed our operating costs in half* by 'trailerizing' our truck fleet," reports Paul Cohen, Supt. of Warehousing & Transportation, Miller's Super Markets, Denver.

"Our Fruehauf Aerovans were placed in service in 1946. Other than regular maintenance, periodic painting and negligible repairs, not a penny has been spent on these units in 5 years of steady 6-day-a-week operation.

"Our refrigerated Aerovans hold their temperatures — protecting the appetizing goodness of our daily-fresh edibles.

"Not only do we consider our Fruehauf Trailers essential to our operation, but we feel this fleet of handsome 'rolling billboards' is a major advertising asset."

The food field is just one of over 100 different industries — businesses large and small—finding in Fruehauf Trailers the way to faster, lower-cost distribution. It will pay you to investigate their application to your business.

Write today for Fruehauf's *free* "Transportation Cost Analysis." The Fruehauf Trailer Co., 10956 Harper Ave., Detroit 32, Mich.

FOODS GET BETTER RIDE!—Exclusive Gravity-Tandem Suspension gives loads a level, cushioned ride. Self-steering action saves tires and fuel . . . cuts product damage. *Users get up to 4 times normal tire service!*

FOODS GET BETTER PROTECTION!—Exclusive integral-frame construction gives greater strength with less weight . . . for bigger load capacity. Trailer is engineered throughout for long life with low upkeep.

FRUEHAUF *Trailers*

World's Largest Builders of Truck-Trailers

YOUR FOOD — and almost all your daily living necessities — are brought to you all or part way by Trucks and Trailers. They make up Motor Transport — our nation's largest transportation system — employing 1 out of every 7 American people.

House of 1,000 Foods

—*Continued from page 97*

The company's spaghetti is prepared in this manner: First comes loading of the uncooked product into a 250 gal.-capacity colander. Carried by an overhead monorail, this colander is lowered into a 400-gal. stainless steel cooking kettle by means of an electric hoist. After the spaghetti is cooked, the colander is lifted out of the kettle and lowered onto a supporting metal frame. It is raised from the frame, after the water is drained from the product, and pushed to a rectangular stainless steel mixing table having a pouring spout at one end. Here, meat or tomato sauce is added and mixed with the spaghetti with a wooden paddle. Spaghetti and sauce is then filled into 5-gal.-cans.

Two Urchel machines dice vegetables for soups and stews, fruits and potatoes for salads, and eggs and celery for sandwich mixes. Turkey meat and barbecued beef are also cut up for sandwiches. Mayonnaise, tuna fish mix for sandwiches, and thickening agents for stews, soups, and gravies are made in a Readco vertical mixer.

Skins are automatically removed from potatoes and other vegetables by a Blakeslee rotary peeler equipped with emery plates. Eggs are hard-boiled and potatoes are blanched in a steam cabinet. A Fitzpatrick comminuter grinds vegetables into a puree, which is then added to soups. This latter machine also grates cheese for topping spaghetti, likewise bread crumbs for casserole dishes.

Wrapped sandwiches are prepared on eight stainless steel tables. On each table two girls prepare the sandwiches and one does the wrapping. Girls making the sandwiches work from two trays—one holding enough sliced meat, cheese, or sandwich-mix for 100 sandwiches and another containing 200 slices of bread. They pass the finished sandwiches to the third girl, who wraps them in waxed paper and puts them in delivery trays that go on racks.

Fresh ingredients are stored in four 15 x 20-ft. coolers (36 deg. F.), each with four ultraviolet lamps suspended from the ceiling. Pickles and fresh vegetables are kept in the first cooler; cheeses, wrapping paper, and eggs in the second; cooked and fresh meats, as well as peeled, diced vegetables and fruits, in the third; and sliced meats and cheeses, sandwich mixes, and salads in the fourth. Frozen meats, eggs, fruits, and vegetables are held in a 15 x 20-ft. freezer.

The company is a Michigan corporation, with John Miller as president. Edwin Sanders is first vice-president, Fred W. Sanders secretary-treasurer, Charles M. Dinger, vice-president and controller, Charles H. Welch, Jr., vice-president in charge of merchandising, advertising, and public relations, and Marc T. Patten assistant secretary-treasurer and director of production and retail operation. K. Phelps manages production; M. Parnall, retail store operations.

End (*Resume reading on page 98*)

FE's Call-Board of Coming Features

Slated for early issues of FOOD ENGINEERING are practical articles a-plenty—every one aimed to aid you in doing a better job of making quality foods at low cost, and every one down to brass tacks on how to do it. Just to name a few—

How to Figure Refrigeration Needs

Costs and Methods for Pie-Stock Apples (Special Report)

Canned Cream Whip—How It's Pressure Packed

Bisulfite Keeps Horseradish Fresh

"Operation Quality" Shows How Better Foods Will Win a Widespread Market

Cheese Coating Goes Continuous

It Cleans Evaporator Tubes Faster

How Frozen-Concentrate Biochemists are Working Out the Fruit Bugs

Easy Way to Prepare Dilute Brine Solutions

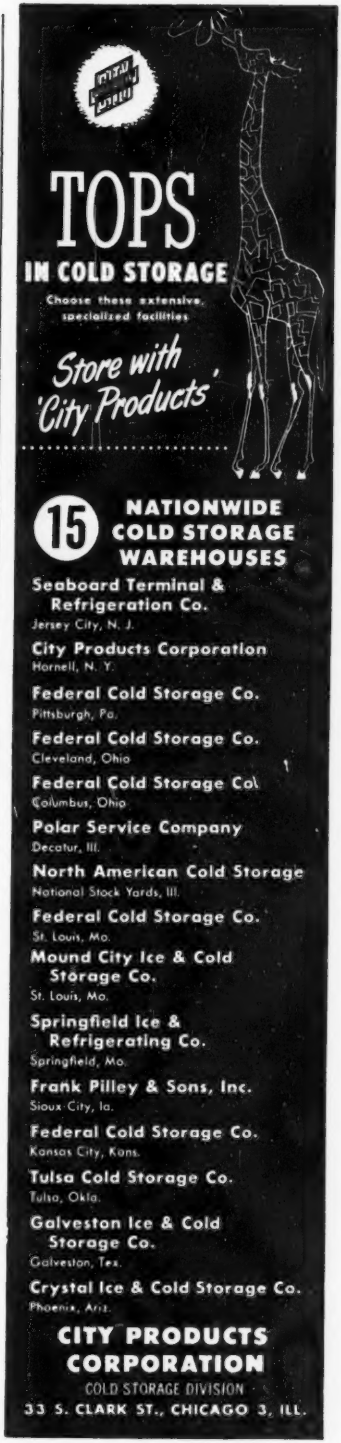
A Short Cut to Personnel Selection

How to Make Your Stainless Go Further

Nitrogen Pack Retains Milk Products' Quality

Filling Line Speeded by Ingenious Synchronization

How Employee Eye Tests Increase Efficiency



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TIME-TESTED pure, highly concentrated essences of the natural fruit.

TIME-TESTED flavoring materials with a major base in true fruit fortified with expertly blended synthetics.

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A test of our flavoring materials will convince you of their superiority and economy in use. Write our nearest branch for samples.

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Advanced Air Conditioning

—*Continued from page* 110

rated. Insulation of the fermentation room is advisable to prevent condensation.

Design of the duct system and the selection and location of the air diffusers are likewise of utmost importance. Due to the difficulties encountered with inferior air distribution devices, some designers have thought it necessary to use direct radiation for heating, atomizing sprays for humidifying, and convection cooling surfaces for temperature reduction and dehumidifying.

It must be considered, however, that the creation of a latent blast load by the introduction of moisture through such atomizing sprays creates a serious moisture condensation problem. This is one feature the bakers were trying to get away from when they adopted air conditioning equipment.

In the experience of the author, a good saturating spray type conditioner —with automatic controls, correct duct lawout, and properly selected air diffusers—constitutes the best solution for the various difficult problems encountered in fermentation rooms.

The installation that has been described adds another strong argument to support this opinion. The room itself has been in use for about two years and is working to the greatest satisfaction of the baker.

End (*Resume reading on page* 111)

Unit Checks pH

—*Continued from page* 99

place, with resulting saponification of fat portions and "neutralizer flavor" in the finished product. Such a flavor was particularly noticeable when neutralization followed processing.

New System Evolved

Obtaining a Beckman flow-type glass electrode and Brown electronic pH recorder was the start of attempts to put cream neutralization on a continuous basis. It was soon apparent that this modern equipment could easily follow pH changes in the flowing cream. And readings were as accurate as previous laboratory determinations.

But finding a way to inject neutralizer continuously was the real hurdle. Pipe line addition under pressure worked poorly due to insufficient mixing and protracted reaction. Automatically controlled vat neutralization only partially solved the problem.

Experiments were then carried out on a process line employing a vacuum

How to "Wrap up" that Big Sales Idea!
POND'S TISSUES
Chuckles
Foulds
BACON
BACON
BROADCAST
...put it up to PACKAGE
When the Big Idea is almost workable . . . When the new packaging slant looks perfect, but needs a machine to make it practical and profitable—that's when PACKAGE engineers put their experience and ingenuity to work for you.
Take bacon and meat wrapping for example. Packers and super market operators were quick to see the many advantages offered by pre-packaging. It speeds up store traffic during rush hours and offers the shopper a more appealing product. But pre-packaging by hand is extremely slow and costly. So our engineers solved that problem by developing two machines. One is a special high-speed Model FA-2 which wraps bacon on cards at 60 packages per minute. The other machine, our Model F, features a self-measuring paper feed which permits the consecutive wrapping of meat on trays varying greatly in height. Both machines won instant approval, and are now widely used by leading companies.
The case of pre-packaged meats is but one illustration of how the Package Machinery Company has been serving industry for the past 38 years. Today the leaders in virtually every field put their packaging problems up to PACKAGE. We believe it will pay you to do the same.
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GLOBE ROTO-CUT meat cutters are the standard of the Packing Industry. They produce better meat products at higher speed.

The Ball Bearing and The Spherical Roller Bearing on the cutter shaft of the GLOBE ROTO-CUT machine.
The Globe Company says:
LUBRIPLATE
SUPER LUBRICATION
FISKE BROTHERS REFINING CO.
THIS LUBRICANT INCREASED BEARING LIFE FROM
2 WEEKS TO 2 YEARS

"After we had quite a few of our large high speed ROTO-CUT meat cutting machines in actual production operation, the ball and spherical roller bearings on the cutter shaft gave us serious trouble. Some bearings did not last even two weeks.

"In an effort to correct the difficulty, we contacted a number of the large lubricant manufacturers. We tried all the lubricants their engineers recommended without the slightest success. We checked with the manufacturers of the bearings who assured us that the bearings were not overloaded. The trouble was the condition that prevails throughout the meat packing industry, animal acids and moisture, a combination most harmful to ball and roller bearings.

"Then, Ball Bearing LUBRIPLATE was called to our attention. The results we obtained from its use were most gratifying and amazing. We have had these ROTO-CUT machines lubricated with Ball Bearing LUBRIPLATE in continuous operation, twenty-four hours a day, three hundred days a year for over *two years without a single bearing replacement.* We now use LUBRIPLATE for factory lubrication and recommend it to our customers for use on practically all the equipment we manufacture."

THE GLOBE COMPANY
Frank J. Bilek (Chief Engineer)

YES, LUBRIPLATE LUBRICANTS ARE DIFFERENT! They reduce friction, wear and power consumption . . . prevent rust and corrosion and last longer than ordinary lubricants. LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases. There is a LUBRIPLATE product best for your every lubrication need. Write for case histories of the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION • Fiske Brothers Refining Company
Newark 5, New Jersey • Toledo 5, Ohio
DEALERS EVERYWHERE • SEE YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE the Modern Lubricant

pasteurizer. When the neutralizer was admitted to the high vacuum chamber of this pasteurizer, an immediate response from the flow electrode—located just downstream—was noted.

It was soon apparent that subjection of the mixture (of product and neutralizer) to vacuum was the ideal way to effect an instantaneous and complete reaction. It prevented objectionable side effects by withdrawing gasses as they were generated. Further, the high-vacuum cooling chamber seemed tailormade for the job. For the pasteurized product was cooled to a suitable 110 deg. F. in this chamber, and elevated vacuum furthered its almost "explosive" co-mingling with neutralizer.

Standardization under vacuum seemed so basic a solution to the problem that a literature search was made to see if the same approach had been tried by other investigators. No such work was revealed, so patents were applied for—the object being to commercially perfect the technic for licensing to the industry.

Working System Components

Robichaux's first step in the design of a commercially acceptable unit was to set up a mobile panel containing all components of the pH control system. On this panel are the Brown pH recorder-controller, the Beckman indicating amplifier, a ½-in. double-seated Honeywell air-operated control valve. And there is a permanent location for the flow-type electrode. In addition, the lower part of the panel holds a compressor (to supply accurate instrument air) and two large glass jars containing alkali, which is fed through the control valve into the vacuum system.

With all equipment thus located, it is a simple matter to roll the panel up to a proper location and connect into the Vacreator with flexible sanitary tubing.

"Hook-up" of panel to Vacreator is as follows: Tubing is run from the bottom of the flow-electrode to a 1-in. petcock in the Vacreator discharge line. Electrode chamber outflow is piped directly to the cream cooler. This by-pass arrangement allows a good, continuous sample to be tested just after the cream is pumped from the high vacuum chamber.

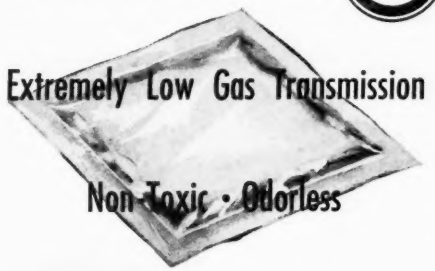
The only other connection involves running the flexible alkali line from the panel to a petcock near the base of the Vacreator's high vacuum chamber. This was found to be a most effective point to add neutralizing solution.

Once connected, the continuous standardizing system functions with

(*Turn to page* 161)

Low MVTR (under 0.15g. Southwick)

HPS



Extremely Low Gas Transmission

Non-Toxic · Odorless

Greaseproof

A NEW ORGANIC MEMBRANE BARRIER

Sara Seal

. . . has many barrier properties previously obtainable ONLY with a metallic membrane

Available WITHOUT "D.O"

FOOD WRAP

Saran Coated Paper

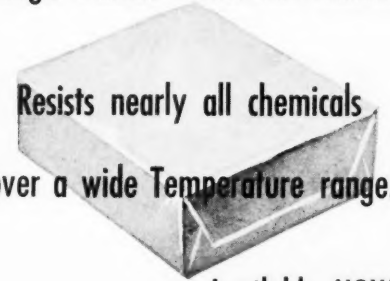
NEW *Sara Seal* is here...

for packaged foods . . . for automatic filling and wrapping equipment . . . Saran thicknesses from 1½ mils up . . . paper weights from 30 lbs. up, according to functional requirements. Investigate the new protective packaging possibilities of this new wrap for foods . . . suggested applications . . .

Dried Yeast • Dehydrated Soups
Powdered Milk

Heat sealable for pouches · bags overwraps unit packages liners

Tough · Pliable · Does Not Shrink



Resists nearly all chemicals over a wide Temperature range.

Available NOW

Coated by the ★LOXOL process

★The LOXOL PROCESS, another HPS development, perfectly unites base stock and thermoplastic resins by hot-melting to paper, fabric or foil. Laminants and residual solvent odors are eliminated, pin holes are unknown, all the resin's values are retained.

Write for Samples · Complete Information

★LOXOL T. M. Reg.

Flexible Barrier Materials • 5007 W. Sixty-Sixth St., Chicago 38, Ill.

For self service shoppers...

A DOUBLE WARRANTY

on every package

On a huge volume of glass-packed foods, nowadays, there's *a second warranty* of purity and freshness to back up the packer's own label.

The Vapor-Vacuum mark on these packages offers indisputable evidence of safety—*and consumers know it!* For years they've been seeing for themselves that packages with this mark always open up fresh.

Consider, then, the importance of this "second warranty" in the strategy of self-service selling:

No one has ever discovered an exact formula for determining the consumer's attitude toward a given food package.

But among the many elements which enter into this attitude, there's a big one which can easily be isolated and evaluated. This all-important element is *the effect of the Vapor-Vacuum mark.*

Just consider, for a moment, the extent of the average consumer's experience with packages which carry this famous mark. The average shopper's purchases of Vapor-Vacuum sealed packages total high in the hundreds. Or, putting it another way . . .

THE "VAPOR-VACUUM" MARK

. . . sales of Vapor-Vacuum Sealed foods now average out at least a package a week for every home.

It's clear, then, that the American shopper has had ample opportunity to observe and absorb one fact of great importance to her:

Over and over, she has seen that Vapor-Vacuum Sealed packages, whatever the brand, always open up fresh and pure. She has learned this lesson so thoroughly that it has become a part of her—an accepted fact of life, like the need for refrigeration, or vitamins for children, or wearing rubbers when it rains. That's why we say that the Vapor-Vacuum mark automatically functions as a second warranty—and thus exercises a constant influence on the shopper.

For the food merchandiser this is one of the fundamentals—a fact he can never escape, no matter how powerful his own brand label.

"VAPOR-VACUUM" Seal and Re-Seal

PRODUCT OF **WHITE CAP COMPANY**, CHICAGO

Congratulations to the Food Industry of America

Enriched foods mean better living for the American people. Ten years ago, when American millers and bakers introduced enriched flour and bread, they launched a new era in nutrition.

Since then, faith in the Enrichment Program has been reaffirmed many times. The human values of enriched foods have been factually established in terms of higher health levels and improved mental and physical vigor.

As we enter the second decade of Enrichment, Merck salutes the Baking and Milling Industries of America for this accomplishment.

MERCK VITAMIN PRODUCTS FOR ENRICHMENT AND FORTIFICATION:

VITAMIN B_1

Thiamine Hydrochloride (*Vitamin B_1 Hydrochloride*)

Thiamine Mononitrate (*Vitamin B_1 Mononitrate*)

RIBOFLAVIN (*Vitamin B_2*)

NIACIN (*Nicotinic Acid*)

ASCORBIC ACID (*Vitamin C*)

Merck Enrichment Ingredients for Millers, Bakers, Cereal and Macaroni Manufacturers —Merck Vitamin Mixtures for Flour Enrichment—Merck Bread-Enrichment Wafers—Merck Vitamin Mixtures for Corn Products Enrichment—Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

Merck is Proud to Have Played a Part in the Enrichment Program

For several years before the birth of Enrichment, Merck research and production staffs had been at work on the synthesis and manufacture of thiamine, riboflavin, niacin, and other pure vitamins. When they were needed for the Enrichment Program, as well as for general food fortification, Merck was ready.

We are proud to have been associated with the food industry throughout these ten historic years of Enrichment.

MERCK VITAMIN PRODUCTS

For Enrichment and Fortification

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY
In Canada: MERCK & CO. Limited—Montreal

Continued from p. 156

no attention. To start up, the desired pH value is set on the controller and all connections between electrode, alkali line, and vacuum unit are opened. Product will then flow continuously through the electrode-sampling-chamber, and its pH will be indicated and recorded by control instruments.

To maintain the desired pH, controlled air, from the instrument, positions the valve on the alkali supply line so that the required quantity of neutralizer enters the Vacreator. Should, for any reason, acidity of incoming cream vary, the controller will automatically increase or decrease the reagent proportionally.

End (Resume reading on page 100)

Safeguard Raw Materials

—Continued from page 68

Suppliers' samples not used within a reasonable time are discarded.

We asked a representative of management for the story behind this efficient and sanitary storage procedure, and we learned that some two years ago the company president began to take a special interest in sanitation, and designated one of his assistants as part-time sanitarian.

At first it was thought that there was not enough room to spare the space for the 18 in. strip around the wall. But examination revealed that nearly a quarter of the storage area was occupied by obsolete machines, paper and other materials better discarded or stored elsewhere. These things had simply accumulated over the years, without anyone paying much attention to them, or attempting to get an okay for their disposal.

In one way or another, the plant got it out, thus providing more space for food commodities and eliminating "dead" storage.

Desirable changes were made in the storage area as available funds and labor permitted. The sanitarian worked with the warehouse superintendent and the employees, always selling them on good sanitation, and explaining why changes in structure and practices were necessary. In this manner the changes were introduced gradually and painlessly. Above all, management always kept the employees aware of any innovation.

This plant's accomplishment was mainly the result of a forthright educational process, teaching that freedom from contamination can only be achieved through adequate preventive measures and practices.

End (Resume reading on page 69)

EVERYTHING'S THE SAME BUT THE NAME

Now It's . . .

The LYON-RAYMOND Corporation

● Under its former name, LYON-Raymond Corporation linked 80 years of successfully manufacturing quality products through three generations of the LYON family with 30 years of maufacturing material handling equipment under the RAYMOND family management.

● Because the name LYON had no connection with present company management and caused confusion with similarly-named manufacturers, it was decided to shorten the name. It is expected that this new name — The RAYMOND Corporation — will better identify RAYMOND family management now and in the years to come.

● The company in the past has built up a reputation for quality products and for pioneering in numerous types of *Hydraulic* Elevating Equipment. During the last several years, we have brought forth a notable number of "firsts"

● Today, under our new name — The RAYMOND Corporation — we will continue to help keep materials moving — in factories, in warehouses, in every field where electric trucks and hydraulic elevating equipment can be applied. And, while our name is changed, RAYMOND policies, services and quality of products will continue on the high standards already established.

A Famous RAYMOND First . . .

SPACEmaker

ELECTRIC TIERING TRUCK

New rider-type truck that gives you up to ⅓ more storage space than conventional tiering trucks. Actually right-angle stacks loads 130" high from aisles only 6-ft. wide. Operates with ease in trucks, boxcars, low-capacity elevators; on lighter-capacity floors.

SpaceMaker Model E2ST
Straddle-type, telescopic tiering truck. 2000-lb.cap.

Send for free Bulletin 703 today

RAYMOND

Formerly LYON-Raymond Corporation

Electric Industrial Trucks Hydraulic Elevating Equipment

The RAYMOND CORPORATION

6253 SpaceMaker Street, Greene, N.Y.

NEW PACKAGES & PRODUCTS

Entire Line of Dairy Products Undergoes Package Redesign

On September 15, the full line of Sealtest dairy products will be made available in new packages through all Sealtest divisions of National Dairy Products Corp.

Adoption of similar cartons throughout the country will familiarize the consumer with the colorful packages, facilitating immediate and positive brand and flavor identification in any outlet where its products are sold.

While seeking maximum product identification and definite family resemblance, the company had to cope with the added problem of local regulations on this packaging program.

On the milk carton alone, over 1,000 different variations of the basic design were developed to conform to diverse local regulations. Therefore, to design cartons that would achieve uniformity was a task of major proportions.

Also, it was decided that product identification should be established by color, making it a simple matter for the shopper to select instantly any specific dairy item.

Tile Design Adopted

Raymond Loewy Assoc., New York City, evolved the tile design for the milk carton. This tile device was adopted instead of the solid color background originally planned because the colored ink tended to spread over the whole surface of the milk carton, interfering with penetration of the wax coating. This trim pattern was then extended to other cartons to give the "family" unity to cottage cheese, cream, butter, eggs, yogurt, egg nog, and other products of the line.

The concept of color-keyed containers first appeared in the Sealtest ice cream cartons introduced last year. Formerly, the ice cream was identified only by a name stamped on a standard carton, making it necessary to do considerable searching for the flavor desired.

Now these ice cream packages carry complementary color schemes, with the background color keyed to the flavor for quick selection, such as blue for vanilla, yellow for chocolate, and green for strawberry. On their four large sides, the cartons carry tempting eye-level color pictures of the ice cream flavor inside. Six basic color-keyed cartons in both pint and half-gallon sizes are included in the ice cream line.

The color code for the four basic milk types is as follows: Bright red for vitamin D homogenized milk, green for Grade A pasteurized, orange for buttermilk, and brown for chocolate milk. These cartons provide a striking contrast when displayed side-by-side in refrigerated cases. Clearly imprinted on the front panel of the gable-top and flat-top containers is the type of milk.

Pint and half-pint sizes of coffee cream are packaged in a medium blue, while the whipping cream carton is dark blue. "Half and half" combines the colors for milk and cream (red and blue). Sour cream comes in a round maroon container in pint and half-pint sizes.

Cottage cheese is packaged in the round cartons, a light blue for creamed cottage cheese, green for flavored types, and brown for special kinds.

Packages for specialty products, such as egg nog and yogurt, vary from the others in that they have stylized lettering for quick identification, and the tile design is used only on part of the packages. Egg nog cartons are green, red and white, yogurt containers are blue, red and white.

Egg cartons are brightly tiled red and white. Butter packages have the tile design in either red and white or blue and white.

All packages carry the familiar red parallelogram and the prominent Sealtest script trademark.

Containers are supplied by about 20 manufacturers.

For More Data on Package Supplies Named Use Reader Service Card

CORROSION CRIPPLES-MORE WAYS THAN ONE

Valuable products as well as vital equipment are threatened

Corrosion takes its toll in more ways than one—it eats away costly, hard-to-get equipment—wastes man-hours while plants are shut down for repairs—and causes loss of vitally-needed products through contamination.

Every industry suffers from corrosion in some form, yet much of this waste can be avoided by taking these steps:

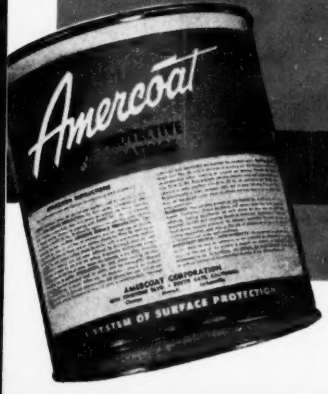
1. Check manufacturing equipment, storage tanks, and other items exposed to corrosive fumes, acids, alkalies, or moisture.
2. Arrange to protect them with AMERCOAT — the corrosion resistant coatings, each built to conquer specific industrial corrosion problems.

Manufacturers in nearly every industry have found that it pays to protect — protect with AMERCOAT.

AMERCOAT CORPORATION

A division of
Ameron Pipe and Construction Co.

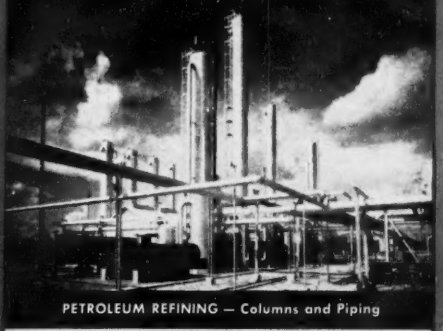
4809 FIRESTONE BLVD., SOUTH GATE, CALIFORNIA



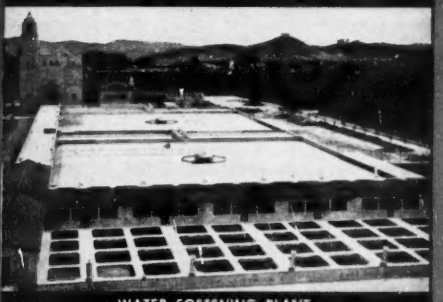
FOLLOW THE LINE OF *most* RESISTANCE

2-51-I

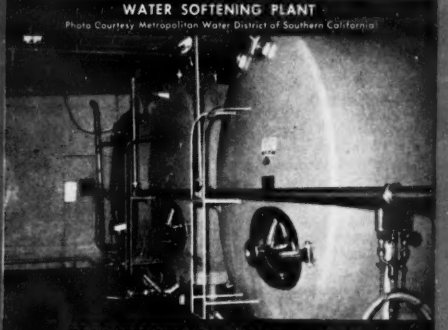
CHEMICAL PLANTS — Caustic Soda Tank



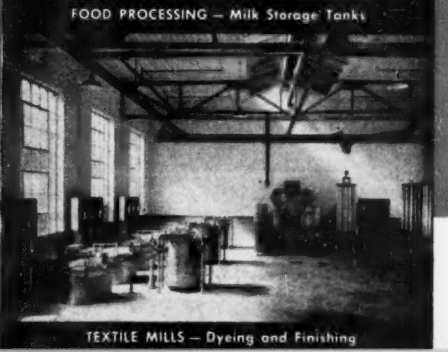
PETROLEUM REFINING — Columns and Piping



WATER SOFTENING PLANT
Photo Courtesy Metropolitan Water District of Southern California



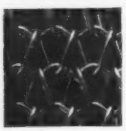
FOOD PROCESSING — Milk Storage Tanks



TEXTILE MILLS — Dyeing and Finishing

No pun intended! This Cambridge woven wire conveyor belt carries cleaned fish through a wash tank to remove scales and scrap so the fish will present an attractive appearance on retail counters.

Cleaned fish are dropped from cleaning table A, onto the surface of conveyor belt B, passing through wash tank C. At the end of the tank hold-down angles change the movement of the belt to a 60° incline. Stainless steel wire, used in weaving this belt, resists corrosive attack of salt water in the wash tank, can be cleaned without damage by steam or by detergents added to the salt water.



In this application, BALANCED BELTING provides low original cost and controllable belt travel. ½" openings in belt weave permit free drainage of wash water and scraps. Angle cleats across the belt hold the fish during the upward movement.

Whatever food you're processing, there's no need to fish around when you want experienced advice on any problem of combining movement with processing. Call in your Cambridge field engineer for his recommendation on the proper . . .

CAMBRIDGE WOVEN WIRE CONVEYOR BELTS—any metal or alloy, mesh or weave. Write direct, or see "Belting-Mechanical" in your Classified Telephone Directory.

FREE BELT CATALOG contains belt construction details, specifications and installation diagrams for many industries. Write for your copy today.

The Cambridge Wire Cloth Co.

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WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Aluminum Pack for Scrapple

The well-known Philadelphia scrapple of The Weiland Packing Co., Inc., Phoenixville, Pa., is now being packaged in a 1-lb. Reynolds Pak, an all-aluminum container, product of Reynolds Metals Co., New York.

The container is formed entirely of lightweight aluminum, and it features a cover attractively printed in blue, red and white.

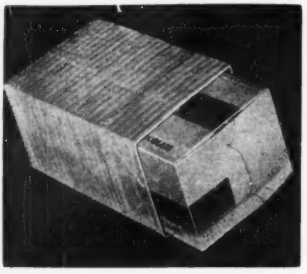
The contents can be sliced right in the container (photo) or entirely removed by a simple "springing" of the tray. Unused portions can be conveniently stored in the refrigerator by replacing the lid on the container.

Previously, the scrapple was packed in 2-lb. packages by pouring the product into a mold and chilling, then hand-wrapping in cellophane. Use of the new greaseproof pack permits hot packing, eliminates handling, allows for quicker chilling, gives better temperature control in storage, and is easier to handle during transportation. Since aluminum has neither flavor nor odor it does not affect the delicacy of the spicing or the natural flavor of the scrapple.

Two-In-One Carton

Using the selling appeal of a two-for-one buy, Crosse & Blackwell, Baltimore, Md., is now marketing two 3-oz. tins of its ham-and-tongue paste in a single chipboard carton.

Colorfully designed in red, white, blue and yellow, the package can be attractively displayed on the grocer's shelf to encourage double sales.

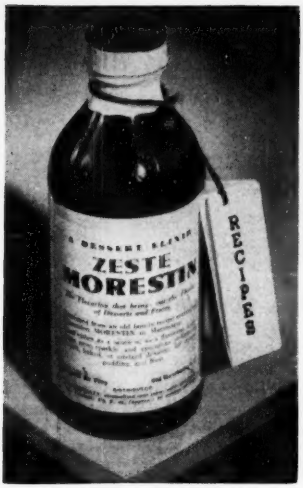


Ice Cream Package

A corrugated ice cream sleeve, said to offer low-cost insulation for ice cream, keeping it freezer-fresh, from store to home, has recently been introduced by Sherman Paper Products Corp., Newton Upper Falls, Mass.

The sleeve is made of heavy corrugated kraft paper, backed with a stiff sheet of bleached white kraft. It is held firmly together with a glue lap, is deep-scored and perforated for easy assembly. The kraft corrugated cushions completely surround the ice cream package when the sleeve is slipped over and sealed. The trapped

"dead" air within the cushions is said to provide an effective insulating blanket, while also acting as a buffer for the package in the event it is dropped, banged, or mishandled in any way by the consumer.



Dessert Flavoring

An "elixer" designed to bring out the flavor of desserts and fruits is now being marketed by Edgard du Prey, Old Westbury, N. Y., under the brand name of Zeste Morestin.

Prepared from an old family recipe served on Morestin plantation in Martinique, it is said to give definite flavor-sharpening qualities to frozen, baked, or custard desserts, ice cream, pudding and fruit.

Containing caramelized cane sugar, water and flavoring, the 8½ fl. oz. bottle, is reported to be sufficient for approximately 60 average servings.

Attached to each bottle is a folder giving detailed recipes on how to use the product.

Bread-Wrap End Labels

Supplier of end labels for bread wraps (FI, March '51, p. 169), Pollock Paper Corp., Columbus, Ohio, has recently issued three unusual new series.

The first features, "Favorite Recipes of Famous Women"; the second, "Woman's Home Companion Choice Recipes," selected by Food Editor Dorothy Kirk; and the third, "Emily Post Selected Recipes."

Each series consists of 64 individual recipes making use of bread. The labels are attractively designed in vivid colors.

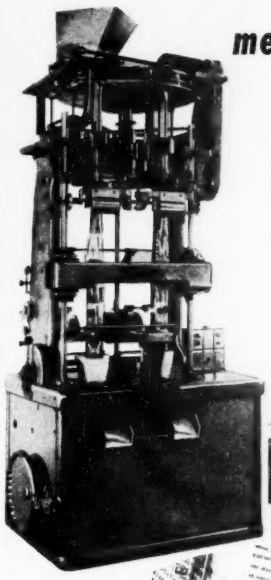
TRANSWRAP

POWDERS TABLETS FREE FLOWING SOLIDS LIQUIDS OR SEMI-LIQUIDS

a better "BAG"

means PLUS sales

. . . at lowest cost



Show your product. Step up your sales with a package that will beat the competition in today's self-service merchandising. Transwrap gives you more eye-appealing package — a package that shows your product — *lets it sell itself.* The first automatic packaging machine to satisfactorily heat-seal polyethylene at high speeds, Transwrap offers you the biggest buy in economy packaging today. If you use any of these heat-sealed "bag" materials, Transwrap can cut your packaging costs in half:

☐ Polyethylene ☐ Aluminum foil
☐ Duplex ☐ Kraft papers
☐ Cellophane ☐ "Tear tape" papers
☐ Vinylite ☐ Laminated stock
☐ Glassine ☐ Vegetable parchments

Volumetric Unit designed to package larger-sized, free-flowing products—40 to 75 units per min. Adjustable down to 1 item per package. Group packages in limited quantities (within 60 cu. in.). Fed by volumetric cups. Pillow packages—with or without gussets . . . 1-13/16"x3" to 5¼"x13". Size—4'x5'x 8½': wght. — 2330; ¾ h.p. geared motor; 1640 volts.

These exclusive Transwrap advantages

• added [illegible] brilliance of bag
• [illegible] uses economical double-[illegible] easy-to-open serrated [illegible] prevents puckering, distortion or [illegible] of bag material

TRANSPARENT-WRAP MACHINE CORP.

Hasbrouck Heights, New Jer[illegible]

Want to cut your packaging costs? Write for our [illegible] brochure—it's free! Shows every Transwrap model—gives [illegible] of economy operation; it's a complete "package" on modern packaging economy! Use this coupon today!

Need help? Transwrap engineers [illegible] glad to assist you in [illegible] packaging requirements . . . make specific recommendations designed to improve your production—at lowest [illegible]

TRANSPARENT-WRAP MACHINE CORP.

140 Rt. 17, Hasbrouck Heights, N. J.

☐ Please send your free 8-page brochure
☐ Have one of your sales engineers contact me—rush!
☐ Furnish delivery and installation data, with terms

Name ..... Title.....

Company .....

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City ..... State .....

MONARCH NOZZLES SOLVE YOUR SPRAY PROBLEMS

In Many Food Processing Plants Monarch Spray Nozzles are used to . . . .

Wax Fruits
Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

Remember

if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

Send for Catalogs 6 A and 6 C

MONARCH MFG. WKS., INC.

2517 E. Ontario Street
Philadelphia 34, Pa.

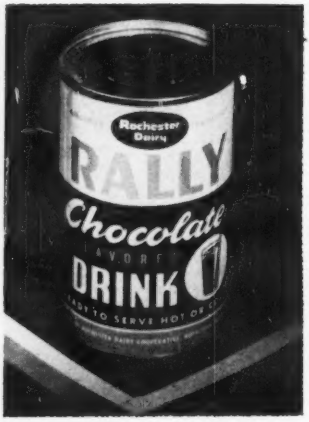
Unique Package Attracts Cheese Gourmets

Stressing individuality, Sue Ann Food Products Corp., Chicago, is offering an assortment of personal-size servings of Cocktail Delight brand cheese spreads.

The food comes in a smart, eye-appealing gift box, called Sportsman's Choice, each container carrying an illustration of a thoroughbred canine. The latter were specially designed and are fired-on by Glasscrafters, Inc., of Baltimore and Chicago.

When empty, the glasses make an attractive addition to the consumer's liquor dispensing cabinet—or similar decorative purpose.

Jars are supplied by W. Braum Co., closures by White Cap Co., and boxes by Congress Paper Co., all located in Chicago.



Chocolate-Flavored Drink

A pasteurized chocolate-flavored drink, under the brand name of "Rally," is now being marketed by Rochester Dairy Cooperative, Rochester, Minn. At present general distribution is confined to the Midwest, except for supply to Army and Navy commissaries.

Available in 8-oz. cans, it keeps without refrigeration until the can is opened, after which it is handled like fresh milk for serving either hot or cold.

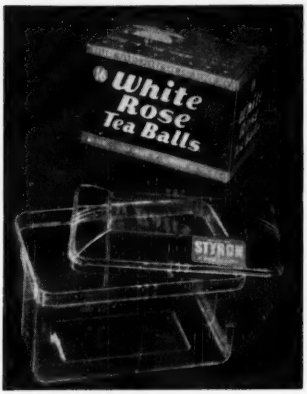
It is made of skim milk, sweet cream, sugar, cocoa, vegetable stabilizer and vanilla.

From Tin to Glass Pack

Eliminating the tin container for its Seazo Popcorn Oil, C. F. Simonin's Sons, Inc., Philadelphia, is now packaging the oil in a decanter-type bottle.

In addition to conservation of vital metal, consumer acceptance is reported

to be enthusiastic. Some of the features of the new container are: Visibility of the product, easy finger-grip handling, and re-use of the bottle for juices and dressings.



Premium With Tea

As an added inducement to try White Rose tea balls, Seeman Brothers, Inc., distributing firm of New York City, is putting its package of 16 tea balls in a container of transparent Styron plastic, a product of Dow Chemical Co., Midland, Mich.

In addition to its use for storing the tea on the housewife's shelf, the container may later be re-employed in numerous ways about the house—as a refrigerator dish, general odds and ends box, salad box, butter container, or the like.

Package & Product Shorts

Peanut Butter in Refrigerator Jar

Offering the re-usable refrigerator jar as an added attraction, Derby Foods, Inc., Chicago, has adopted a new 20-oz. package for its Peter Pan peanut butter. Duraglas jars, supplied by Owens-Illinois Glass Co., Toledo, Ohio, are used.

New Pineapple Flavor

Known as "SK No. 4," a new pineapple flavor is now being introduced by Samuel Kline, New York City, for the ice cream and beverage industry.

Imported Oregano in Re-Usable Jars

A favorite ingredient in Italian cooking, imported oregano, is now being marketed by Durkee Famous Foods, Cleveland. It is packaged in a re-usable glass container with a snap-on lid. The label is printed in both Italian and English.

New Baby Food for Youngsters

A custard pudding for young children is being nationally distributed by H. J. Heinz Co., Pittsburgh. It is processed with whole eggs, milk and cream.

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Per 100 lbs. of finished product, use 1 to 1½ oz. Huron MSG in fresh pork sausage, 3 oz. in roasted pork sausage, 1 to 2 oz. in #1 wieners and bologna or 1½ to 3 oz. in #2 wieners and bologna (with cereal added).

In canned meats such as canned hamburgers, corned beef hash, meat and vegetable stew, meat loaf, chow mein use 2 to 4 oz. Huron MSG per 100 lbs. of product.

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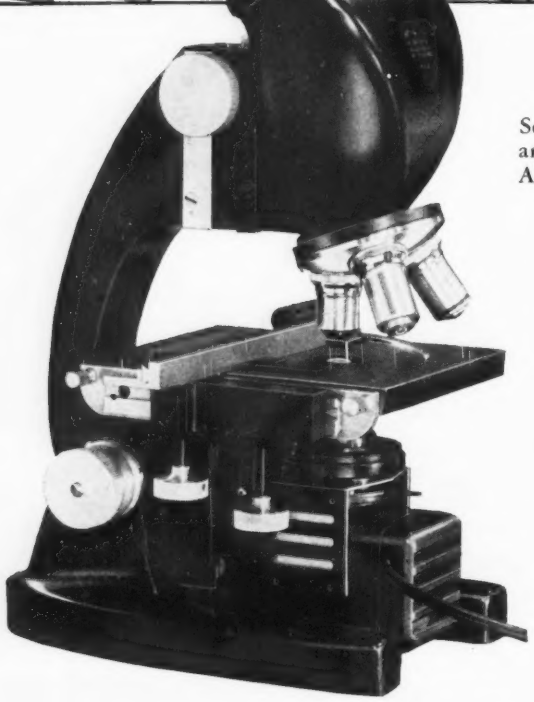

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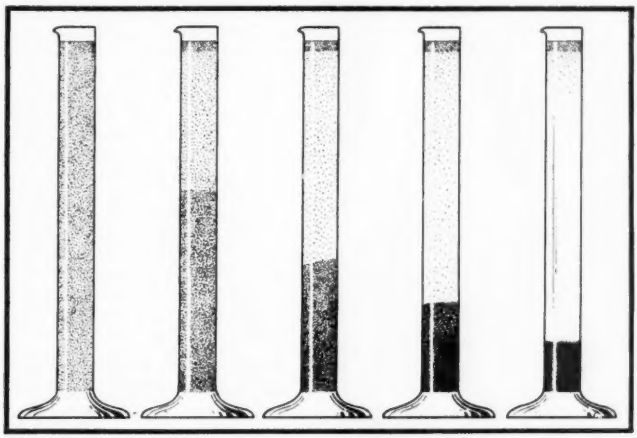

Temperatures During Handling and Storage Influence Quality of Citrus Concentrates

No significant changes occur in frozen concentrated citrus juices stored at 0 F. or below. However, at +5 F. change in cloud retention is slow but definite, as indicated in the illustration above, showing samples of frozen tangerine juice reconstituted after 330 days storage at (l. to r.) 0, +5, +10, +15 and +20 F.

Changes in can appearance (first indication of degradation) are noticeable in 110 days at +5 F., and progressively sooner at higher temperatures.

These are results of an investigation conducted jointly between Minute Maid Corp. and U. S. Citrus Product Station to determine effects of storage temperatures ranging from subzero to +75 F. on stability and acceptability of citrus concentrates. Samples were commercially concentrated orange, tangerine, grapefruit, and grapefruit-orange packaged in 6-oz. tins, frozen and stored at −20 F. Later, adequate numbers of cans of each were placed in storage at 75, 45, 25, 20, 15, 10, 5, 0, −8, and −20 F. At chosen intervals cans of each kind of concentrate were removed from storage for inspection and examination.

As the storage period progressed bacterial population decreased rapidly at all temperatures below 25 F. Flavor deterioration was observed at the end of 70 days in samples stored at 25 F.; 91 days at 20; 175 days at 15. No change was noted in samples stored at 10, 5, 0, −8 and −20 F. Vitamin C loss was exceedingly low even at the higher temperatures.

Digest from "Storage Temperature Effects on Frozen Citrus Concentrates," by C. W. DuBois and T. J. Kew, *Refrigerating Engineering*, 772-75, 812, Aug. 1951.

Pineapples Juice Constituents Subject to Great Variations

Studies conducted over a period of three years emphasize the individual variations of pineapple fruits with respect to total soluble solids, total acids, and ascorbic acid.

Three commercial varieties of pineapples were tested. An entire crate of fruits was used in each experiment and each fruit was analyzed separately. Fruits per crate numbered 16 to 18 for large, and 25 to 36 for small. The pineapples were peeled, cored, and macerated, and the juice was filtered through two thicknesses of cheese cloth.

Considerable difference was found between maximum and minimum values for total soluble solids. The extreme example occurred in a lot of Cayenne pineapples in which the average was 9.1 percent, with a maximum of 12.4 and a minimum of 6.0. Average increase of maximum over minimum for all lots was 64 percent.

Greatest variation in total acids occurred in the Abachi variety. Maximum was 1.00, minimum 0.55, and average 0.86 g. per 100 ml. of juice. By far the greatest variation between individual fruits was found in the ascorbic acid content. The Cayennes showed an increase of maximum over minimum of 60 percent. In the Red Spanish variety the increase was 153 percent. For all lots the increase of maximum over minimum averaged nearly 90 percent. Results of the investigation show the necessity for large samples in experimental work with pineapples, especially if the fruits are obtained from commercial lots on the market.

Digest from "Individual Variation of the Fruits of the Pineapple (*Ananas Comosus L. Merr.*) in Regard to Certain Constituents of the Juice," by Erston V. Miller and Eva E. Schaal, *Food Research*, 252-57, May-June, 1951.

FISH

Canning Frozen Salmon

Three types of changes may take place when using frozen salmon for canning that do not ordinarily occur when fresh fish is canned. They are: (1) Bacterial spoilage during the freezing process; (2) deterioration (mainly oxidation of the oils and pigments of the flesh) during storage; and (3) alteration in the salmon which is brought about directly by the freezing process.

The first change can be completely

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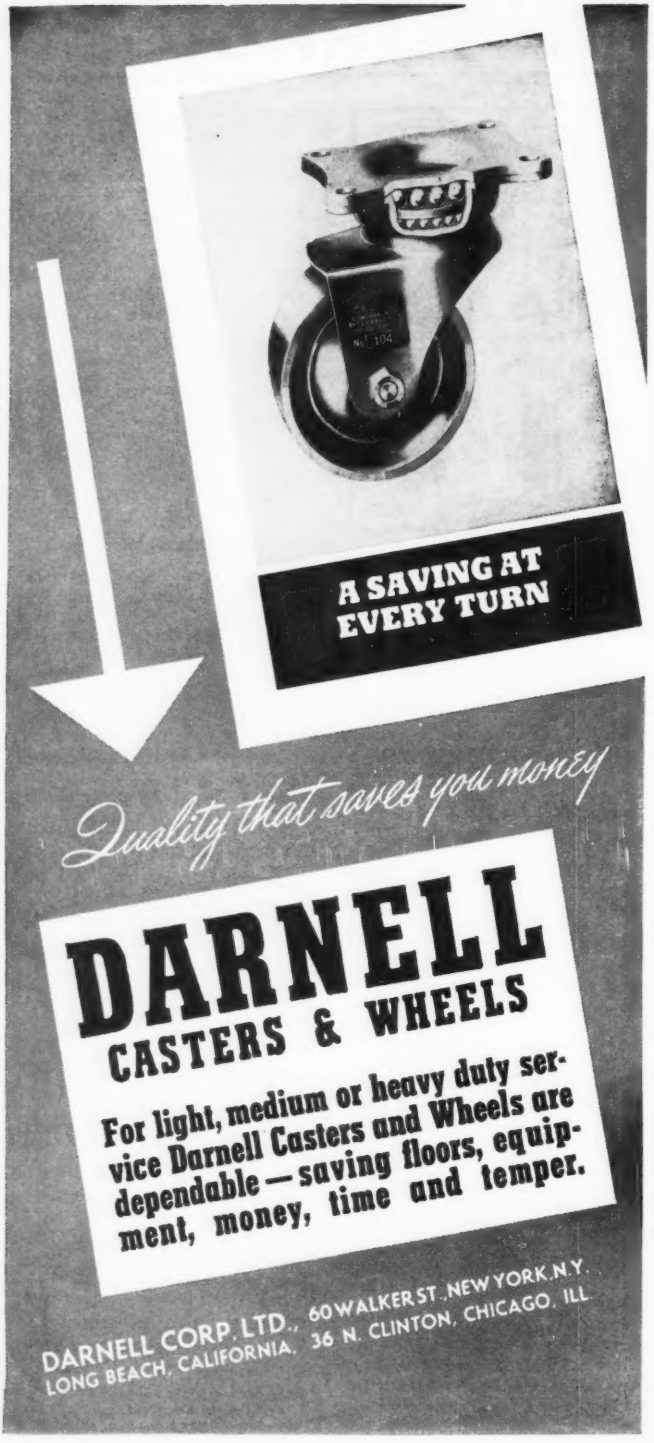
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eliminated by using an adequate refrigeration capacity and by making certain that the system is not overloaded. Most of the changes during storage can be minimized by using good handling practices and proper temperatures. Fish stored at 0 F. will keep more than twice as long as those held at + 20 F. To protect the fish from air, an ice glaze should be provided as soon they are completely frozen, and reglazing should be done as needed to replace that lost by evaporation.

Alterations in the fish resulting in loss of free oil, formation of a protein curd, and development of undesirable texture of the product canned from frozen fish, are changes for which there are no simple remedies. However, they can be minimized by limiting storage to 2-3 months at 0 F.

Digest from "Use of Frozen Salmon for Canning," by M. E. Stansby and J. Dassow, *Commercial Fisheries Review*, 20-25, April, 1951.

BAKING

Reduction in pH of Batter Improves Cake Quality

Investigation has been made into the rate of heat penetration during the baking of shortened cake batters varying in pH value, and the results have been correlated with certain quality characteristics of the finished cakes.

Variation in the pH value of the basic formula for plain cake batter was made by adding to the baking powder either 1.0 or 0.5g. baking soda, or 1.0 or .05g. cream of tartar. Batters were baked in an electric oven thermostatically controlled at 365 F. Baking time for cakes containing 1.0g. added soda averaged 1 min. longer than for those made from the basic formula alone or with additions of cream of tartar or 0.5g. soda.

Heat penetration curves for the plain batter and for those containing added cream of tartar are similar, although the temperature of the latter averaged 2-3 deg. higher than that of the former. The curve is practically a straight line except for a slight flattening between the 16th and 20th min. of baking. Curves for the batters with added soda flattened decidedly, that containing 1.0g. soda showing pronounced flattening beginning at the end of the 12th min. Slow transfer of heat in these batters was probably due to the large amount of CO_2 evolved, as indicated by the low sp. gr. of the uncooked batters. Both soda batters began to show a rise in heat penetration after the 20th min. and all curves coincided at the 28th min.

Significant changes in volumes were observed, cakes containing added soda being appreciably larger than the oth-

ers. There was a high correlation between lightness of batter and lightness of cake.

Experienced judges scored the cakes for whiteness, fineness and uniformity of cells, sweetness, flavor other than sweet, moistness, tenderness, and overall desirability. The added ingredients caused a significant difference in each of the 8 characteristics. Cakes made with added cream of tartar were rated above those from the basic formula, and these in turn were ranked above those made with added soda. The more acid the batter, the whiter, moister, and more tender the cake crumb, and the sweeter and better in flavor other than sweetness. Raising the pH of the cakes gave not only the undesirable taste of soda but also an eggy odor. Finer and more uniform grain was obtained from cream of tartar batters, while those containing added soda had a decidedly coarse and uneven grain. These characteristics of cakes made from soda batters may be due in part to slower heat penetration and to the delay in gelatinization of the starch. Delay in coagulation of egg protein may be another factor in causing poor texture of cakes made with added soda.

Digest from "Heat Penetration During Baking and Quality of Shortened Cakes Varying in pH Value," by Helen Charley, *Food Research*, 181–86, May-June, 1951.

DAIRY

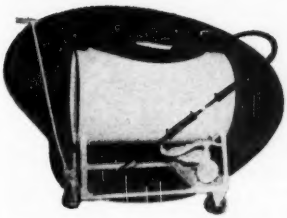
Preventing Oxidized Flavor In Frozen Whole Milk

During frozen storage of milk, a heated flavor diminishes in intensity and may finally disappear. Therefore, milk that is to be stored a relatively long time can be given a more severe heat treatment in an effort to prevent development of oxidized flavor than milk that is to be consumed after a short storage period.

In an attempt to determine the extent to which development of an oxidized flavor in frozen milk can be prevented by heating without impairing the flavor and body of the thawed product, samples of raw milk were heated to 160, 165 and 170 F., held for 0.25, 1, 3 and 5 min., homogenized, cooled, frozen and stored at +1 and −16 F. for 4 months. The supplementary effects of ascorbic acid and boiling in a vacuum pan were also studied.

Results indicate that heat alone, when insufficient to impair the flavor and body of the thawed product, will not prevent development of an oxidized flavor at either of the two storage temperatures employed.

Best results were obtained when milk was heated to 160 F. for 1 min. and



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fortified with 50 mg. ascorbic acid per liter, and to 170 for 1 min. followed by brief boiling in a vacuum pan.

Digest from "Heating As a Means of Preventing An Oxidized Flavor in Milk During Frozen Storage," by R. W. Bell and T. J. Mucha, *Journal of Dairy Science*, 432-37, May, 1951.

Determining QAC In Milk

The presence of quaternary ammonium compounds in milk (in the range of 5-100 ppm.) may be determined both qualitatively and quantitatively by application of the following test:

Place 1 ml. of milk in a test tube, add 5 ml. distilled water, 1 ml. indicator, 0.2 ml. buffer and shake vigorously for 10 sec. Centrifuge to separate solvent fraction from milk solids and water. (If a Babcock centrifuge is used this may take as long as 25 min.) Presence of a QAC is indicated by development of red color in the bottom (solution) layer. A pink color indicates at least 5 ppm. QAC.

To determine the exact quantity of QAC, remove top layer and pour solvent into a second test tube. Flush first tube with 5 ml. water, add this to solvent and agitate 5 sec. Allow to separate and remove top layer. Wash solvent with two additional 5 ml. portions of water then add 1 ml. distilled water and 0.1 ml. buffer and titrate mixture with standard anionic solution. Quantity of QAC is indicated by ml. anionic solution required to remove red color.

How to prepare reagents: (1) Indicator solution is made by dissolving 0.5 mg. eosin yellow dye in 1 ml. acetone and adding 1 ml. of this to 9 ml. tetrachloroethane, then adding 10 mg. citric acid crystals to each ml. of dye solution, shaking until reddish color disappears, and filtering. (2) Buffer solution is made by adding 2.5g. citric acid crystals to 100 ml. water and adjusting pH to 3.5 with 50 percent NaOH. (3) Anionic solution (0.01 percent) is made from 10 percent Fisher Laboratory Aerosol. (4) Standards for comparison should be made by adding known quantities of the QAC to unhomogenized milk samples to provide final concentrations covering the range suspected in the test samples.

Digest from "A Rapid Method of Testing For Quaternary Ammonium Compounds in Milk," by D. D. Miller and P. R. Elliker, *Journal of Dairy Science*, 273-78, March, 1951.

SANITATION

Effective Rat Control With Dicoumarin

Fatal spontaneous hemorrhages are produced in rats by relatively small doses of dicoumarin fed regularly for a number of days. This anti-coagulant is used in concentrations that are relatively safe for man and domestic animals. It has the further advantage that it does not seem to induce bait shyness or poison prejudice, and rats and mice continue to feed on it until the last one is dead. Control can be

made continuous by establishing permanent bulk baiting stations supplied with enough bait to last a month. In this manner reinfestation can be prevented. Another anti-coagulant, 3:4 coumarol, or Warfarin, is more effective than dicoumarin against certain kinds of rats, but it lacks the safety margin of the latter for human beings and domestic animals.

Dicoumarin bait is prepared by treating whole wheat flour with 0.08, 0.16, or 0.32 percent dicoumarin, depending on the rodent to be exterminated. The mixture is then distributed at a number of baiting stations, depending on the area infested, and baiting is continued until there is no further evidence of live rodents. In a typical example, a brewery covering about 12 acres was infested with ship rats.

In first trial 364 baiting points were established in the most heavily infested areas. This was later reduced to 54 bulk baiting stations supplied with enough bait to last a month. Peak consumption of bait was reached in about 10 days, followed by a sharp decrease in feeding, which ceased entirely in 6 or 7 weeks. Thirteen months after the completion of the test the brewery was still clear of rats.

Digest from "Advances in Rodent Control," by M. D. Price, *Food*, Vol. 20, 210–14, June, 1951.

BEVERAGES

Wine Made Continuously

Fermentation of crushed grapes in such a way as to produce wine continuously and at the same time recover the CO_2 evolved is the object of a recently patented process.

In its operation, crushed grapes are fed into the conical bottom of a closed vat in daily quantities equivalent to ¼ its capacity. At end of 4th day, there are formed: (1) A top layer of finished warm wine and fully fermented cap of skins and pulp, (2) two layers of half-fermented wine or must at slightly lower temperatures, and (3) a zone of fresh, cold crushed grapes.

Skins and pulp, owing to their lower gravity, rise and are distributed over the upper portion of the vat in 4 layers. Gas bubbles, evolved in the fermentation, adhere to the skins and pulp and aid in floating these materials. These gasses are removed continuously, compressed and passed through a condenser for the separation and recovery of CO_2.

At the end of the 5th day, finished wine and fermented cap are withdrawn from the top in quantities equivalent to the feed of crushed grapes. Seeds and solid matter are withdrawn from

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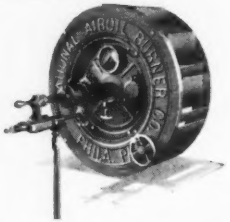

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the bottom of the cone. Provision is made for recirculation of the wine when it is necessary to alter the course of the fermentation.

Digest from U. S. Patent 2,536,993-94, issued Jan. 2, 1951, on applications dated May 29, 1946 and Aug. 23, 1948, respectively, to V. M. Cremaschi, Buenos, Argentina.

Small Quantities of Glutamates Improve Flavor of Beer

Because the well-known property of monosodium glutamate is able to moderate taste qualities—its own taste is scarcely apparent in small amounts—its effect on two types of beer was tested at levels of 50 to 400 ppm.

One beer was a highly fermented Pilsener, strongly hopped; the other a low-fermentation export beer, full-bodied and mildly hopped. The monosodium glutamate was dissolved in the beers at 32 F., and they were allowed to stand 24 hr. before tasting.

In amounts up to 200 ppm., the effect was that of mellowing and rounding of the taste, with some amelioration of the hop bitter taste in the Pilsener and an evident increase in full taste. The effect was less pronounced in the export beer, and only at 150-200 ppm. was there any noticeable effect on the bitterness. Both beers suffered in quality at 400 ppm., some "meaty" quality then becoming evident. At higher levels, the characteristic taste of the beer was injured.

While the taste-rounding effect of monosodium glutamate is confirmed by these preliminary results, it was obtained on beers of normal flavor. The effect on beers of abnormal taste qualities was not considered.

Digest from "Glutamic Acid and Beer Taste," by Hermann Fink and Kurt Woger, *Brauwelt*, 1951, No. 17, 326-7, April 26, 1951.

VITAMINS

Vitamins By Fermentation

Riboflavin and some other members of the B-complex group of vitamins, including vitamin B_{12}, are produced by some microorganisms in generous quantities.

Ashbya gossypii, for example, ferments grain alcohol stillage, and gives significant increases in vitamin content. Ribloflavin increases from 17.0 meg. per g. in the original distillers' solubles, to 15,000 meg. per g. Other significant increases were: Pantothenic acid, from 25 to 210; pyridoxin, from 9 to 40; B_{12} from 0.1 to 1.8, and the *Lacto bacillus bulgaricus* factor (a chick growth stimulant) from 0.2 units to 5.0 units per mg.

Fermentation of distillers solubles is improved by addition of stick liquor

from packing house operations, or fermentable carbohydrate. On a 1,000-gal. pilot plant scale, a medium of stick liquor, 50 percent stillage, and 2 percent dextrose, flash pasteurized 3-min. at 280-290 deg. F. gave best results. Fermentations lasted 84 hr. at 72-75 F. with both aeration (1/6 volume of air per volume of medium per min.) and agitation. Commercial production of vitamin concentrates by this method has been advanced to a 15,000 gal. fermenter scale.

Digest from "Biosynthesis of Riboflavin, *L. bulgaricus* Factor, and Other Growth Factors," by K. L. Smiley, M. Sobolov, F. L. Austin, R. A. Rasmussen, M. B. Smith, J. M. Van Lanen, L. Stone, and C. S. Boruff. *Industrial and Engineering Chemistry*, 1380-83, June, 1951.

MISCELLANEOUS

Corrosion of Glass Surfaces By Alkaline Solutions

Ten years of study on the corrosive action of NaOH solutions on glass bottles has yielded information of value to brewers and manufacturers of soft drinks.

Early investigations showed that caustic soda washing solutions tended to dissolve and otherwise depreciate the surfaces of bottles. Temperature and time of exposure are important variables, a 30-deg. rise in temperature tripling the rate of attack. Effective inhibitors were found in sodium aluminate, sodium zincate, and other similar salts. The zinc compound is most effective and, if used in sufficient quantity, can reduce corrosion almost to zero. Among organic materials, tannin was found to be the most effective inhibitor. Partial replacement of caustic soda by trisodium phosphate increases the corrosive action. Soda ash and sodium metasilicate have little effect.

It is apparent, however, that almost all visible defacement of bottles is mechanical, or of combined mechanical and chemical origin. Hence it is important to prevent mechanical damage. Once damaged, the surface is easily attacked by chemicals, and wear becomes ever more rapid and severe.

The importance of eliminating scratching and abrasion, and thus preventing visible damage to the bottle, is seen in the fact that an increase by 1 or 2 in the number of trips made per returnable bottle will offset the cost of an inhibited alkali; and an increase of 10-20 trips can reduce the cost of bottles purchased to an extent sufficient to pay the total cost of alkali.

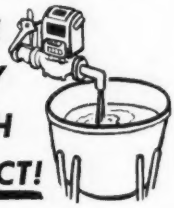
Digest from "The Action of Alkaline Solutions on Glass Surfaces," by P. N. Burkhard, L. R. Bacon, and W. F. Wegst, *Proceedings*, annual meeting 1950, American Society of Brewing Chemists. —*End*

1/8" HERE
BOTCHES THE BATCH
BY A GALLON

Why risk it?

PUT IN ACCURATE, CLEAN NEPTUNE METERS AND

MAKE EVERY BATCH PERFECT!



Inaccurate liquid measurements can add up to tremendous waste of materials, time, and effort—to say nothing of lost quality. For instance, it's tough to read a gauge stick down inside a 4-ft. tank, yet an error of just ⅛ in. means a whole gallon too much or too little liquid added.

For formula-perfect batches time after time — automatically — put a Neptune Auto-Stop Meter in every liquid supply line. The operator pushes buttons to set the quantity desired, opens the valve, and the Auto-Stop shuts off at the right point—accurately—keeping your inventory and production figures for you as it goes along.

Neptunes have greater accuracy, longer life and lower maintenance because they're simpler, cleaner, precision built. Many types available for any liquids where sanitary or corrosion factors permit composition bronze.

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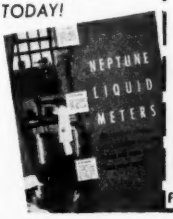

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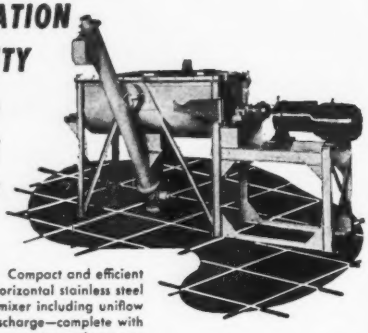
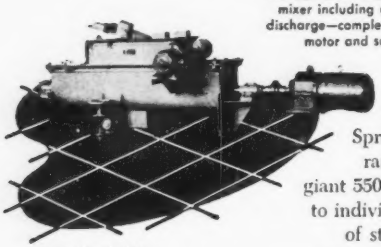


Compact and efficient horizontal stainless steel mixer including uniflow discharge—complete with motor and support.

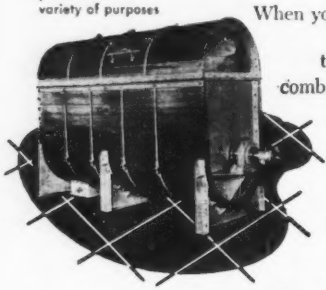


A combined sifting and mixing unit in use by a number of leading food processors for a variety of purposes

Sprout-Waldron horizontal mixers range from 2½ cu. ft. capacity to giant 550 cu. ft. equipment. Engineered to individual needs, they may be made of steel, stainless steel, non-ferrous metals, or wood. They can be jacketed for heating or cooling... lined with glass, porcelain, rubber, etc.

When you entrust your food mixing problems to Sprout-Waldron you are assured that 85 years of engineering know-how combined with outstanding manufacturing facilities will invariably provide the perfect solution.

A Sprout-Waldron representative will be glad to consult with you without obligation. Meanwhile, write for Bulletin SM-346. Address: Sprout-Waldron & Co., Inc., 35 Waldron St. Muncy, Pennsylvania



This rugged, watertight mixer of wood construction is used in many fields, including starch manufacturing.

145-A

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SIZE REDUCTION | MIXING & BLENDING | BULK MATERIALS HANDLING | PRODUCT CLASSIFICATION | PELLETING & CUBING

Military Packaging

—*Continued from page* 114

packaging problems tentatively solved. In some cases, a sizable gap remains between the ideal package and what is now practical. But the two have at least been brought together sufficiently to afford a working solution.

In a number of other instances, however, further work is indicated before the ideal is satisfactorily approximated. Results to date have been encouraging, but not conclusive. The search is still going on for readily available materials that furnish good protection, present no unusual difficulties of manufacture, and can withstand the abuse that is so often an unavoidable characteristic of the military supply line.

Table III lists a number of current packaging and packing problems, the chief deficiency in each case, and the result desired.

Future Problems

Packaging and packing problems of the future are known in their general outlines on the basis of past military experience. However, it must be admitted that specific difficulties that may arise in future modes of warfare are unknown, and will have to be met and solved as they arise.

■ One of the most spectacular difficulties may well be how to package against radioactive contamination. Such a problem will involve basic research which, at present, has scarcely been initiated.

Despite such unpleasant prospects as are raised by the need for maintaining subsistence in good condition in areas contaminated by radioactivity, or even chemical or bacteriological agents, there is also a happier side. It can be said that, relative to ordinary circumstances, today's packaging and packing for the armed forces is, for the most part, reasonably close to being adequate.

As in the past, the challenge of better packaging for new military conditions will be met through cooperative effort between the QM Food & Container Institute, private institutions, and industry.

It is hoped that this article, by setting forth the general considerations pertinent to food packaging for the armed forces, and by defining some specific difficulties, will assist those interested in working with the Institute toward development of new and improved packaging that will meet the exacting requirements of the military. *End* (*Resume reading on page* 115)

Performance Records Prove...

. . . that trucks equipped with Eaton 2-Speed Axles make faster trips, travel more miles, at lower cost per mile. They reduce strain and wear on engine and power transmitting parts, permit the engine to run at peak efficiency under all operating conditions. Records also prove that Eaton's exclusive features, including forced flow lubrication, and planetary gearing, add thousands of miles to axle life, and assure top performance for the life of the vehicle. Ask your dealer to explain how Eaton 2-Speed Axles pay for themselves many times over.

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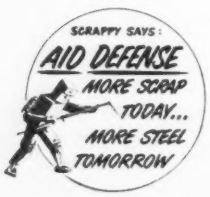
Put *one* man in charge of getting all the scrap in your operation collected and turned over to your scrap dealer. Set the date for the job to be done.



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JONES & LAUGHLIN STEEL CORPORATION

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Bin-Handling Drys

—*Continued from page* 85

is sealed at the mill and not opened until ready for use is the most sanitary method we can visualize. It might be compared to sealing in a Mason fruit jar. The flour would be adequately protected, even if it were shipped in insect infested box cars. In addition to this, the elimination of all flour dust in our warehouse and dumping area has been a big improvement over the bag practice. Empty bags, which were a source of in-plant infestation, no longer pile up. Our flour is never stored for over seven days, which is considerably less than any insect incubation period. Therefore, our worries in this regard are gone. For bins have no cracks or crevices through which flour might become infested.

"Our Omaha installation proved to us that we finally had the right flour-handling method—one that answered all of our problems at a comparatively low cost. Following this we made similar installations in Kansas City and in Los Angeles. We plan still more installations soon."

Although most of the out-plant transportation of bins is by motor truck, rail transportation can also be used profitably where circumstances make it preferable. Twenty-two bins fill a 40-ft. car; 28 bins can be shipped in a 50-ft. car. When bins are shipped by rail, a car can be unloaded in less than 1 hr. by power truck. Twelve or more man-hours are necessary for manual unloading of a car having equivalent weight of material packed in bags.

In-Plant Uses and Advantages

Some companies employ bins only for in-plant applications. One transports broken cocoa cakes from presses to pulverizers. In another, a dozen or more products, to be used as ingredients, are stored in bins and transported within the plant, speeding and improving operations.

A third company, during each 24-hr. period, accumulates finished products in bins to supply filling machines during an 8 hr. packaging operation.

Regardless of the many out-plant advantages, in-plant advantages, alone, often justify use of the bins. Lower in-plant labor costs, no losses from spillage or breakage, a cleaner, dust-free plant, freedom from insect infestation, and improved sanitation off-set initial costs.

End (*Resume reading on page* 86)

GET POSITIVE CONTROL OVER FOOD QUALITY

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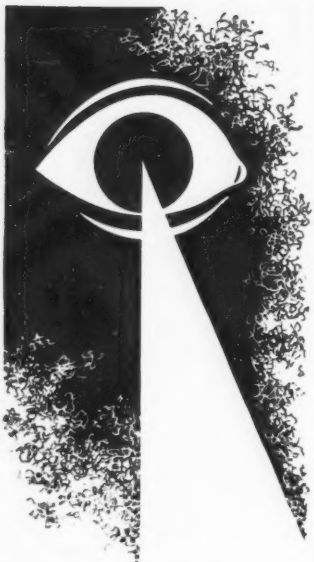

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Questions & Answers

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

THIS MONTH'S PROBLEM

Question—Can you suggest any methods for prechilling flour employed in making cake batters? We'd like to chill our flour low enough so that the temperature of the batters will be about 70 deg. F.

Answer to July Problem

The Question Was—We have been approached by a state-wide chain of concessionaires who are interested in having us pack fresh wieners in 1-gal. jars so that they can steam-heat them for serving in buns. Is there any way we can cold-pack the franks without them becoming too salty?

Answer—Wieners must be heat-processed when they are packed in glass jars, otherwise spoilage would soon take place. Spoilage would be attributed to bacterial decomposition as well as putrefaction of the frankfurters.

Even vacuum-packing of frankfurters is not enough to stop spoilage. Bacteria must be killed in the meat by heat-treatment. And the use of chemical preservatives is not permitted.

Best way to pack the franks for the purpose intended is to put them up in a tray, overwrap with Cry-O-Vac, pull a vacuum in package, heat-seal the film, and then keep the product under proper refrigeration during distribution.

Another method would be to put the wieners in 5- or 10-lb. packages and then freeze them. Of course, such frozen franks must be kept frozen until ready for consumption.

Wants to "Sulfur" Fruits

Question—We are using frozen fruits to make jams, jellies, and preserves. But our production has now increased to a point where we do not have sufficient cold storage space for the frozen fruits needed. Is there anything prohibiting us from treating fruits with a sulfur dioxide solution, then putting them up in barrels and storing them without the need of refrigeration?

Answer—As defined by USDA, fruit jams and preserves are "the product made by cooking to a suitable consistency properly prepared fresh fruit, cold-pack fruit, canned fruit, or a mixture of two or all of these, with sugar or with sugar and dextrose, with or without water."

Thus, under this definition, fruits preserved with sulfur dioxide solution could not be used for the manufacture of jams and preserves. Denial, in this instance, is by implication rather than through regulations and tolerances.

Use of sulfur dioxide solution is limited to cherries for maraschino products and fruit salads; fruits prior to dehydration; fruit pulp for wines, brandies, and other fermented products; and watermelon rinds for preserves, pickles, and fruit cake.

It may be noted here that in England jams, preserves, and marmalades are made from such treated fruits, as much as 1,800 to 2,200 ppm. of sulfur dioxide being added to each barrel of fruit.

Flat Sours Cropping Up

Question—Last year, the brine we were adding to cans of corn had a high flat sour-spore count, which showed up despite the fact that we were using metal brine tanks and sugar that met the National Canners Assn. bacterial standards. Can you tell us of any source of contamination that we may have overlooked?

Answer—We do know that some canners of whole kernel corn had the same trouble you did. And according to investigations recently carried out by the NCA, the difficulty was traced to a moderately heavy, boiler-type scale found in the brine-mixing tanks and delivery pipes. As expected, this scale proved to be an excellent haven for flat-sour spores. After following the NCA technologists' suggestions for de-scaling the tanks with muriate acid and installing new pipe sections, the difficulty was eliminated.

Gelatin Dessert Formula

Question—Do you have processing details for a coffee-flavored gelatin dessert powder?

Answer—Here's a simple formula you can use: Fine granulated sugar, 100 lb.; gelatin, 13½ lb.; soluble coffee, 5½ lb.; and salt, ⅔ lb.

Now to making the dessert powder: In an air-conditioned room, blend the coffee and gelatin in a Hobart mixer. Spread the mix in trays, dry for 4 days, and grind it. Add the sugar into a horizontal Day mixer, then introduce the coffee-gelatin mix and salt. Mix until all ingredients are thoroughly blended. Run the powdered dessert through a No. 10 mesh sieve, and fill 3 oz. of product to a package.

Using Honey as Sweetener

Question—Regarding the article on utilization of honey as a substitute sweetener (p. 182, May FE), could you give me more information relative to permission to substitute honey in a new product I propose to manufacture?

Answer—By writing to the production & Marketing Administration, USDA, Washington 25, D. C., you can obtain a copy of *Honey Diversion Program* (1951 marketing season), a covering letter entitled *Notice to Applicants*, and blank application forms.

When we discussed this subject briefly with one of the USDA officials, he suggested that along with the application form you should submit a supplementary statement giving additional facts to aid the department in determining if the product is *new*, within the definition given, and is not similar to any products being manufactured by other firms.

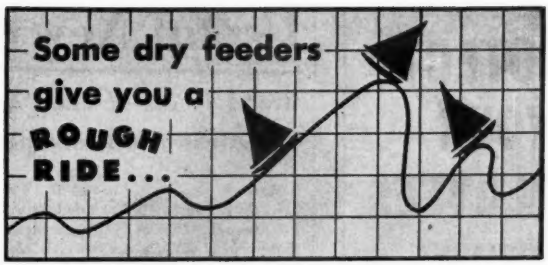
Hazy Beer

Question—Is it true that some types of caramel coloring agents produce an undesirable haze in beers?

Answer—In suspension, caramel coloring agents behave in a similar manner to proteins and have well-defined isoelectric points—the pH value at which the charge on the caramel colloid is zero.

Studies have shown that a good beer caramel should have an isoelectric point around 7.0 in order to stabilize the colloids, which are generally positively charged, at the normal beer pH values.

Caramels with isoelectric points lower than the pH of normal beers are negatively charged and will, therefore, produce an undesirable haze over long periods. *—End*



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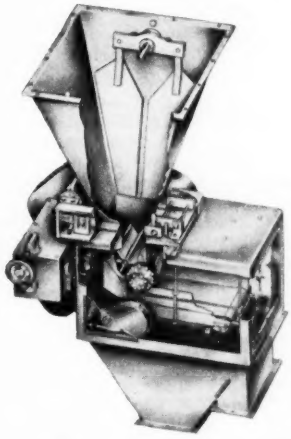

Omega CHEMIZER is a *complete* feeder, including hopper agitators, alarms, dust-tight housing, sampling chute, positive non-flooding feeding mechanism, and other important features contributing to accuracy and ease of operation. For Bulletins 35-G5 (Omega CHEMIZER) and 10.20-F5 (Blending Dry Foods Continuously), address Omega Machine Co. (Division of Builders Iron Foundry), 402 Harris Ave., Providence 1, Rhode Island.

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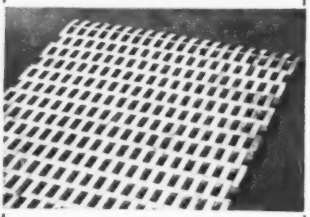

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ADVANCES IN FOOD RESEARCH, VOL. III. *Edited by E. M. Mrak and George F. Stewart. Published by Academic Press Inc., 125 East 23rd St., New York 10, N. Y., 1951. 518 pages; 6¼ x 9¼ in., cloth. Price* $9.50.

The editors have again come up with an excellent group of resumes on a particularly tough theme—that of exhaustively and critically reviewing, on a continuing basis, all the research done in the more important food fields.

This entire series is notable for the way in which the contributors and editors have prepared their copy. All the subjects deal with highly-technical material, but anyone interested in the manufacture of foods can get much out of the text.

Of more than passing interest are the chapters on dry milk products, the application of all methods of electromagnetic radiation to foods, evaluation of antioxidants, internal corrosion in tinplate containers, consumer preference studies, and control of microorganisms causing spoilage in fruit and vegetable products. A complete bibliography follows each section.

There is a thorough review, by B. E. Proctor and S. A. Goldblith, of the many advances made during the past ten years on radiation treatments of foods. The uses of sonic and ultrasonic vibrations, infrared, ultra-violet, X-rays, and cathode ray radiations are discussed in relation to sterilization, blanching, roasting, dehydration, aging, chemical analysis, and many other food operations.

The chapter, "Physical and Chemical Aspects of the Production, Storage and Utility of Dry Milk Products," by S. T. Coulter, R. Jenness, and W. F. Geddes, provides interesting reading in light of the many innovations in the modes of milk merchandising. As well as delving into the physical and chemical properties, quality control, and manufacture, a complete section is devoted to the basic chemical changes occurring in dry milk during storage.

Included is a marketing section by R. L. D. Morse: "Rationale for Studies of Consumer Food Preferences." Here, the general types of studies are critically appraised, and methods used in interpreting the data are discussed. A comparison is made of the relative merits of the consumer survey and the market survey.

Agricultural Technology

CROPS IN PEACE AND WAR, 1950-51. *Government Printing Office, Washington 25, D. C. 942 pages; 6¼x9¼ in.; cloth. Price,* $2.50.

Processing of all major American farm products, for industrial and food uses, byproducts from them, utilization of wastes and secondary materials, new uses, and requirements of consumers and markets, are discussed in this latest yearbook of agriculture. It is largely a report of the work of USDA's four regional research laboratories, established a little over ten years ago.

Nearly 200 contributors, starting with the Secretary of Agriculture, make the book an outstanding reference volume of modern agricultural technology. Originally scheduled for issue in 1950, it was postponed when Congress requested a second edition of *Grass*, the 1948 Yearbook.

Attractive drawings and charts, and even a few structural diagrams of organic chemicals, add to the appearance of the book. A 32-page glossary and a 20-page index at the end make the book easy to use and should add greatly to its popularity.

All About the Pectins

THE PECTIC SUBSTANCES. *By Z. I. Kertesz. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y., 1951. 628 pages; 6¼ x 9¼ in.; cloth. Price* $13.50.

This comprehensive review should help correlate the many loose ends of information on the pectins. It is liberally documented with references.

Besides describing the methods of manufacture, standard testing technics, and commercial applications, the author also has summarized the chemical and biological aspects of the subject. Included are composition and structure, properties, detection and determination, occurrence and distribution, and the enzyme phase of the pectic substances.

A complete chapter is devoted to the effect of pectins in the processed food field. Discussed here are such

foods as jams, jellies, dairy products, beer, tomatoes, fruit juices, pickles, and sugars.

Processing of Soybeans

SOYBEANS AND SOYBEAN PRODUCTS, VOL. II. *Edited by Klare S. Markley, Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.,* 1951. 1145 *pages;* 6¼*x*9¼ *in.; cloth. Price,* $11.

This work is a continuation of Vol. I. The first book discussed the history of the production of soybeans, their structure and composition and, from a very general standpoint, their processing.

This present book gets down to processing details, covering fully all angles of solvent extraction, edible and non-edible soybean oil products and byproducts, soybean meal and soybean protein foods, and protein industrial products.

Government Publications

A SUMMARY OF THE WATER SITUATION IN THE UNITED STATES, WITH SPECIAL REFERENCE TO SURFACE WATER. *Geological Survey, unnumbered document.* Indicates typical quantities available, major factors in water movement, and principal present industrial uses. A very general statement, but included are some significant statistics by regions.

A DIGEST OF INFORMATION ON CHLORDANE. *By R. C. Roark. Bureau of Entomology and Plant Quarantine, E-817.*

AGRICULTURAL STATISTICS, 1950. *Bureau of Agricultural Economics. Large statistical volume of nearly* 800 *pages. Price* $1.75.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

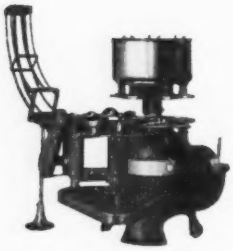
RULES AND REGULATIONS OF THE SECRETARY OF AGRICULTURE GOVERNING GRADING AND CERTIFICATION OF MEATS, PREPARED MEATS, AND MEAT PRODUCTS; AND ADMINISTRATOR'S INSTRUCTIONS THEREUNDER. *Production & Marketing Administration SRA-PMA* 98, *rev.*

OFFICIAL UNITED STATES STANDARDS FOR GRADES OF SLAUGHTER CATTLE. *Production & Marketing Administration, SRA-PMA* 112.—*End*

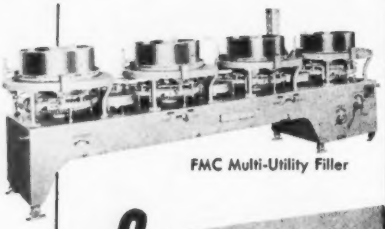
Wrap your packages automatically

Hayssen Automatic Wrapping Machines wrap all kinds of packages at low unit-cost. Packages are trim in appearance and well-protected. The Hayssen is low in initial cost . . . mechanically simple, sturdy and speedy. Write today.

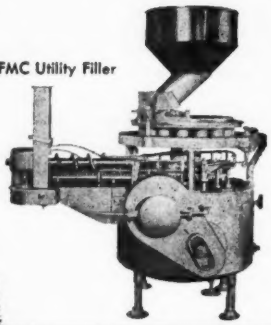
HAYSSEN MFG. COMPANY • SHEBOYGAN, WIS.



FMC 6-Valve Juice and Pulp Filler

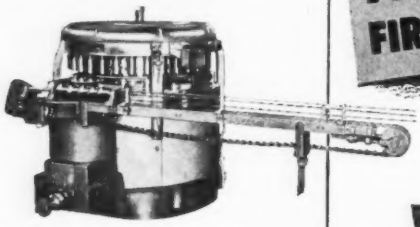


FMC Multi-Utility Filler

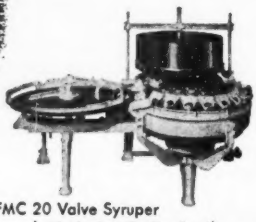


FMC Utility Filler

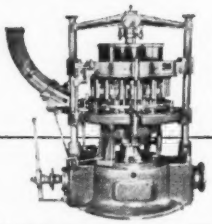
fmc FIRST IN FILLERS



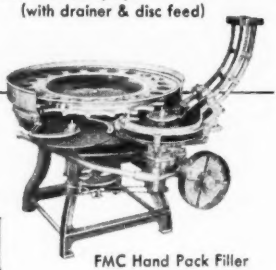
FMC M&S 30 Pocket Plunger Filler



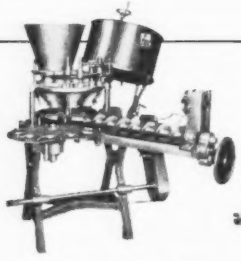
FMC 20 Valve Syruper
(with drainer & disc feed)



FMC M&S 15 Pocket Plunger Filler



FMC Hand Pack Filler



FMC 8 Station Pea & Bean Filler

FMC Model 15 Carton Filler

DEPENDABLE FILLERS OF EVERY TYPE FOR EVERY NEED

Through long experience in working with canners for the best solution of particular filling problems, FMC has developed and perfected a complete line of filling machines designed to—

- **Speed up and simplify operations.**
- **Eliminate waste and loss through accurate product fill.**
- **Increase capacity through greater flow-line efficiency.**
- **Produce maximum quality pack at reduced cost.**

The fillers shown above are typical of FMC's line of skillfully engineered machines. All have been thoroughly tested and proved to provide canners with the highest quality filling standards. Whether your requirements call for canning liquid, semi-liquid, whole or granular products, or for packaging frozen foods, there's a FMC Filler built to do the job more efficiently and economically.

Write for full information, or call your nearest FMC representative.

First in Diversified Food Equipment

fmc FOOD MACHINERY AND CHEMICAL CORPORATION

FOOD MACHINERY AND CHEMICAL CORPORATION
Canning Machinery Divisions

General Sales Offices:

EASTERN: HOOPESTON, ILLINOIS **WESTERN:** SAN JOSE 6, CALIFORNIA

KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Canned White Bread

The Weber Baking Co., Long Beach, Calif., has recently completed a government order for more than 500,000 cans of white bread. Vacuum-packed in the No. 2½, 10 oz. size cans, the shipment is destined for our armed forces.

The bread, baked from a special, high calorie-content formula, is formed into two equal halves and canned. The lids are clinched on, but not sealed during proofing and baking—to allow gases to escape. Vacuum in the closed can is controlled by the amount of time taken for cooling before complete sealing.

The producer has indicated that the canned bread will remain edible for an indefinite period. Before opening the can, however, a preliminary heating will insure oven-freshness by driving moisture uniformly through the loaf.

Several modifications to existing plant facilities had to be made before this successful commercial run started. Plant capacity is 100 cans per min., with the actual operating rate 50 per min. Special machinery was provided by both the American Can Co. and Continental Can Co.

Adjust Cannery Wages

The Wage Stabilization Board has acted to temporarily restore traditional differentials between cannery and agricultural wages in order to facilate the processing of the 1951 crop of perishable fruits and vegetables.

The Board has adopted a resolution permitting firms engaged in seasonal canning—also packing, freezing and dehydrating of canned products to pay —without prior approval of the WSB —rates that maintain 1950 differentials between the wages of such establishments and agricultural wages in the same area.

Test Apple Concentrate

Preliminary results on the market prospects of frozen apple juice concentrate are favorable, according to tests conducted by USDA and the Washington State Apple Commission.

During a 10-week period, the juice was offered to consumers in Tyler, Tex., and Modesto, Calif., and it was found that repeat purchases ran almost 70 percent.

The promotional market tests were prompted as part of the Research & Marketing Act to increase consumption of apples, avoid recurring surpluses, and find a profitable method of disposing of "C" grade and cull Delicious apples.

The volatile flavor-recovery technic, developed by USDA, was used in the test concentrate. Aromatic esters were collected and concentrated during processing and mixed back into the fruit-juice concentrate before freezing.

The juice itself was a blend of 50 percent Delicious, 20 percent Jonathan, 20 percent Winesap, and 10 percent Rome Beauty. Natural acidity was about 0.4 percent.

Want Steel?—Sell Scrap

We're losing the race for steel scrap. Consumption by steel furnaces is running ahead of collections at the time of year when the industry traditionally builds up inventory.

In May, when scrap should have started piling up faster than it was used, steel companies tapped their inventory for a net decline of 90,000 tons. And in June, decline, despite collections, was 44,000 tons.

If scrap collections cannot be increased enough to correct this trend, winter's steel output will show a marked reduction. Even now inventories are a third of the safe level, showing 20 days' supply instead of 60.

All factories—including food processing plants—are again urged by NPA to quickly sell to scrap dealers all their junk and obsolete equipment. (See editorial, FOOD ENGINEERING, Aug., p. 134.)

Clarity on Surface Agents

"The use of surface-active agents in foods as permitted by existing or officially proposed standards of identity has not been questioned."

This statement was just issued by the Food Protection Committee of the Food & Nutrition Board to clear any misunderstandings stemming from its study of experimental data on the agents in ice cream.

Furthermore, the committee says: ". . . the research data and information concerning use of the surface-active materials were insufficient to reach a sound estimate of the safety or hazard presented by their use in foods."

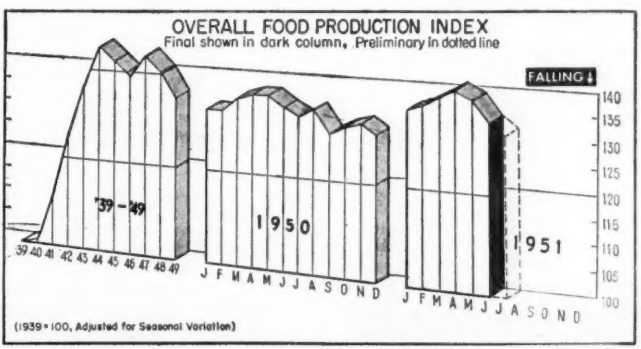
Dr. St. John, executive secretary of the committee, expects that October will be the earliest for another meeting on the matter. Feeling is that an early decision is improbable.

Bigger Candy Bars

Remember how the size of the 5c. candy bar dwindled in proportion with purchasing power of the dollar these past few years? Well, some nickel bars are getting heavier again, which may be the start of a swing-back.

Curtiss Candy and several other manufacturers recently upped the size of some of their popular-sized bars. And Hershey and Nestles have cut wholesale prices on a few best sellers —although their bar size remains the same.

Lessened consumer demand and dropping cocoa, coconut and sugar prices have brought about the present turnabout. Per capita consumption of candy has declined 12 percent from the 1944 peak, while other sweets, such as ice cream, have gained.

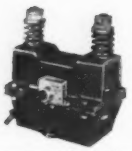


Adaptable To Most Phases Of Food Processing

SYNTRON

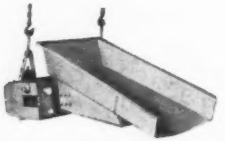
VIBRATORY EQUIPMENT

Handle Bulk Food Products at Rates From A Few Pounds To Hundreds Of Tons Per Hour



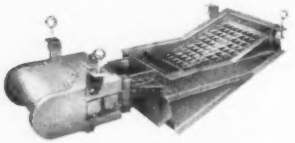
ELECTRIC VIBRATORS

Assure free-flow of food products, such as starch, powdered sugar, etc., from bins, hoppers and chutes.



VIBRATORY FEEDERS

Instantly controllable rates, from a trickling dribble to a gushing torrent—feeding fruit bits, dehydrated soups, potato chips, prepared pie and cake mixes to packaging machines—spices to grinding mills—coffee to driers—pickles to picking tables.



VIBRATING SCREENS

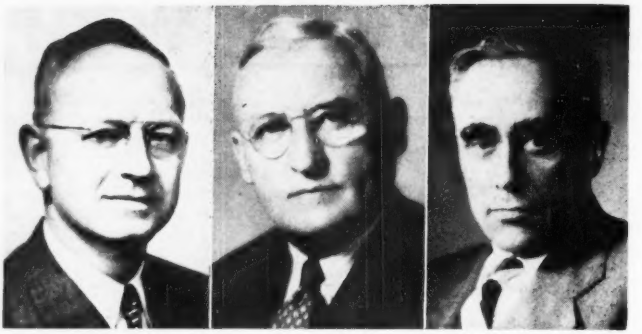
Remove foreign objects and lumps from powdered coffee, sugar, salt, etc.—Dewatering chopped and diced vegetables—Classifying peas, beans, nuts, etc.

Others

GRIZZLIES—PACKERS—JOLTERS
HOPPER LEVEL SWITCHES
WEIGH FEEDERS

Write for Catalog

SYNTRON CO.
400 Lexington Ave Homer City, Pa.



GEORGE HAMPTON C. ELDRIDGE L. E. WATERBURY

GF Elects Three VP's

General Foods has elected the above three men to vice-presidential positions in the corporation. Mr. Hampton now heads several of GF's operating divisions. Mr. Eldridge has taken charge of all marketing activities, and Mr. Waterbury continues in the capacity of general counsel and secretary.

Rancidity in Frozen Peas

Blanching is a necessary step in maintaining superior storage qualities for best grade frozen peas, according to tests conducted recently at the New York State Agricultural Experiment Station, Geneva, N. Y. Unblanched peas, it was found, develop an undesirable hay-flavored rancidity after prolonged cold storage. Chemical changes in the lipids, or fatty materials, of the peas were shown to be mainly responsible.

Analyses were made after a five-year storage period at 0 deg. F. Two lots were frozen using fancy grade Thomas Laxton peas. Only one lot, however, was exposed to the blanching treatment before packaging and freezing. Rancidity was measured by peroxide and acidity numbers of the lipid matter in both lots.

To check the affect of the 60 sec. hot water treatment on freshly harvested peas, samples of both blanched and unblanched Thomas Laxtons were analyzed. Neither batch showed signs of rancidity.

Before and after five year cold storage, the blanched and raw peas had about the same sugar and starch content. The unblanched peas, however, showed considerable loss of carotene and chlorophyl.

Cuts Sugar Beet Losses

Better and longer storage qualities keynote a new strain of sugar beet, developed recently by Colorado breeders with the cooperation of USDA. Savings to beet-sugar processors can thus be visualized, since the operating season would be effectively lengthened.

Economical storage has long been a problem in the industry—especially since mechanized harvesters have shortened the digging period. Until recently, stored beets would partially rot, heating and burning up much of their valuable sugar.

Reduction of this loss involved forced ventilation of cool air through storage areas. Now loss can be cut still more by breeding beet types with roots of lower respiration rate, and with higher resistance to rot. Since the latter characteristic is controlled by heredity factors, the progeny of hundreds of "mother" roots of a leaf spot-resistant variety were selected as "keepers."

Dr. G. H. Coons of the Plant Industry Station says the strain may provide the basis for a new variety of plantings in regions subject to leaf-spot epidemics.

Record Turkey Year

More turkeys than ever before will grace the plates of Mr. and Mrs. America this year. Indications are that over 53 million gobblers will be raised during 1951—15 percent over last year.

This increase may be explained by high beef prices, improvements in turkey breeding technics, and a year-'round trend in turkey consumption.

Improved marketing methods have also spurred demand. "Ready-to-cook" birds, with entrails removed and wrapped in transparent plastic, now represent almost 40 percent of turkeys sold. Some of these come with leg tendons removed. This innovation, made possible through a special tendon-puller developed by Swift & Co., enables easier carving of the drumstick.

Frozen fillets, "frankfurters", "turkeylets", and "turkey logs" are a few of the new products being

marketed. The fillets are breastbone cuts, with a deboned thigh promised shortly. The "frankfurters" are made from ground turkey meat, seasoned, packed in a casing and cooked. Ground turkey is also the basis for "turkeylets", or prepared patties.

A number of firms are producing "turkey logs"—boned raw turkey compressed into cylinders and frozen. The "logs" are prepared for eating by baking and slicing.

Would Hydrogenate Meat

Hydrogenation of meat products to inhibit deterioration is considered feasible and worthy of investigation, according to Dr. Raymond Reiser, associate professor of biochemistry and nutrition, Texas A & M Research Foundation, College Station, Tex.

Hydrogenation would convert highly oxidizable and liquid fats of bacon and soft pork (from peanut-fed hogs particularly), to stable and comparatively hard saturated fat. If successful, the method would permit bacon to be stored at normal temperatures.

Bacon fat contains about 10 percent linoleic acid. The conversion of 50 to 75 percent of this to oleic acid would effectively stabilize the bacon.

Near Record Harvest

In spite of heavy flood damage, the second largest harvest in the nation's history is forecast by the Department of Agriculture.

Record crops are expected for hay, rice, and grapes, while soybeans and tobacco will be near-record. Above average will be corn, sorghum grain, sugar-cane, hops, oats, sugar beets, apples, pears, and tree nuts.

On the adverse side, a combination of floods and hot dry weather have cut estimates for wheat, barley, potatoes, and peanuts. This year's wheat crop may be the first in eight years to be less than a billion bushels. A large holdover of this commodity, however, assures the country an ample supply.

Citrus Exchange to Produce

Florida Citrus Exchange will produce and market a frozen orange concentrate under its brand name, Sealdsweet.

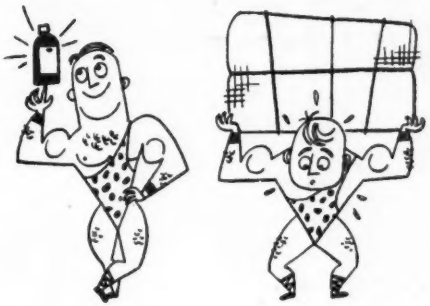
John T. Lesley, general manager of the exchange, says the reason for this decision is that many grower members have at times been unable to sell their fruit to frozen citrus concentrators.

"Florida produced a 100,000,000-box crop for the first time this season," said Mr. Lesley, "and it became obvious that all methods of distribution—

give your products

a new **"taste-lift"** with

SPISORESINS



● Samson made an unshakable place for himself in history by hefting mighty objects, and strong men the world over have since labored to emulate him. But the modern food processor and manufacturer of dry and liquid seasonings is seldom naturally equipped for such activity. Therefore to transport and store the heavy, awkward bags of spices his products require, he must perforce hire warehouses, trucks and several muscular, 20th century Samsons!

● Not so the manufacturer who has discovered **SPISORESINS!** For **SPISORESINS** require no more space than the neat, compact essential oil bottles on his plant shelf, and are as easy to use. Pourable, of superior flavor value, entirely free of mold and yeast spores, **SPISORESINS** simply eliminate the storage problem. A 5 lb. bottle of **SPISORESIN** Black Pepper is equal in flavor value to a 150 lb. bag of the spice itself. Solvent extractions of natural spices, **SPISORESINS** are available in all important Basic flavors and over 60 different Compounds.

● Give your products a "taste-lift"—your entire operation a "convenience-lift". Let the small bottle of **SPISORESINS** *retire* the extra warehouse, the truck, the sanitation problem, and the "Samsons" to the glorious, but inconvenient, past.

D&O ESTABLISHED 1796

DODGE & OLCOTT, INC.

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ATLANTA · BOSTON · CHICAGO · CINCINNATI · DALLAS
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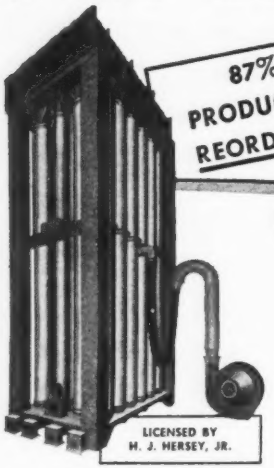
ESSENTIAL OILS · AROMATIC CHEMICALS
PERFUME BASES · VANILLA · FLAVOR BASES

INDUSTRY IS PROVING DAY "AC" DUST FILTERS



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Archer-Daniels-Midland Co.
Atkinson Milling Co.
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Buckeye Cotton Oil Co. Div.—Procter & Gamble Co.
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Ralston Purina Co.
Schlitz Brewing Co.
A. E. Staley Mfg. Co.
. . . and others.

THIS SUCCESS STORY SPEAKS FOR ITSELF

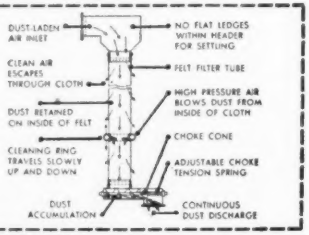
The soundness of the Day Type "AC" Dust Filter principle, effecting outstanding efficiency of operation with minimum maintenance, is verified by industry itself. 87% of our production of Day Type "AC" Dust Filters is channeled to meet the demands of users who are witnessing the results in their own plants—and reordering.

FEATURES OF THE DAY TYPE "AC" FILTER

- **CONTINUOUS-AUTOMATIC OPERATION** . . . the use of slow traveling, reverse jet cleaning rings gives automatic-continuous operation without shutdowns for cleaning.
- **CONSTANT AIR VOLUME** . . . the back pressure of DAY Dust Filters rises slightly when first started, then levels off to assure constant air volume.
- **PARALLEL AIR FLOW** . . . in the DAY Dust Filter, dust and air travel downward together.
- **HIGH AIR-TO-CLOTH RATIO** . . . 10, 15 or even 20 to 1 ratios maintained with uniform back pressures.
- **HIGH CLEANING EFFICIENCY** . . . with reverse jet cleaning, high grade filtering materials can be used because the action is gentle yet positive. Reverse jet rings move up and down, cleaning continuously.
- **NO DUST-CATCHING LEDGES** . . . DAY TYPE "AC" FILTERS, with a pattern of square-to-round inlet fittings, have no flat surfaces where dust can accumulate and become contaminated.
- **OUTSTANDING ADAPTABILITY** . . . units can be furnished with multiples of 4 tubes; housed or unhoused (see illustration); can be applied for either pressure or vacuum.

SCHEMATIC OPERATING DESIGN

The reverse air jet mechanism provides uniform cleaning over the entire length of the tubes, and operates with a maximum cloth area loss of only 1¾% at any time. Air volumes remain constant and there are no cleaning shutdowns to cause high back pressures and sharp air volume variations.


DUST-LADEN AIR INLET
NO FLAT LEDGES WITHIN HEADER FOR SETTLING
CLEAN AIR ESCAPES THROUGH CLOTH
FELT FILTER TUBE
HIGH PRESSURE AIR BLOWS DUST FROM INSIDE OF CLOTH
DUST RETAINED ON INSIDE OF FELT
CHOKE CONE
CLEANING RING TRAVELS SLOWLY UP AND DOWN
ADJUSTABLE CHOKE TENSION SPRING
DUST ACCUMULATION
CONTINUOUS DUST DISCHARGE

Write-to-**DAY** for Bulletin 491

The **DAY** *Company*

SINCE 1881

817 3rd Ave. N. E.—Minneapolis 13, Minn.
IN CANADA: P. O. Box 700, Ft. William, Ont.
Branch plants in Fort Worth, Buffalo and Welland, Ont.

fresh fruit, frozen concentrate and single strength canned—must be utilized to the fullest extent. Since less than 20 percent of the people in the nation are now using frozen concentrate and the field is wide open for further distribution, our growers are seeking to take advantage of this marketing opportunity."

The exchange will advertise extensively its top brand in both fresh and processed form. It plans to cooperate with all factors interested in promoting distribution of citrus products.

Detroit OK's 4-Day Milk

Although dating of milk bottle caps will continue in Detroit, the city council has decided that dealers may sell four-day-old milk, an amendment to the Detroit milk ordinance having extended the time milk can be sold from 72 to 96 hr.

Milk dealers had argued that dating was unnecessary and that a code system should be used. Consumers, they said, reach for the newest-date milk, even though the older is satisfactory.

Vive la Condensed Wine

The quartermaster corps of the French Army believes that it has finally solved the problem of furnishing soldiers with available supplies of their national drink—wine.

Freeze-concentrating to produce a condensed wine is said to be the answer. By removing the bulk of water in the form of ice crystals, the remaining liquid contains all original natural constituents, including alcohol.

Put up in small individual bags for field use, the concentrate, when mixed with five parts of water, is termed equal in quality to regular bottled wines.

Sucrose vs. Corn Sugar

Per capita consumption of dextrose (corn sugar) has more than doubled and corn syrup consumption has risen nearly one-fourth, according to USDA.

The importance of corn sweeteners has increased, especially in the baking, ice cream and canning industries, with the trend toward industrial preparation of processed foods. But use of the corn product is generally restricted to one-quarter or one-third of total sweetener requirements.

Relative sweetness is only one factor considered by food manufacturers in selecting the sweetener or blend of sweeteners for each product. Effect on flavor and moisture-retention quality of the product, control of crystallization, control of fermentation, cost, in-plant handling problems, and restrictions imposed by Federal or State

regulations, are other important considerations.

These trends in consumption of major sweeteners were studied by the sugar branch of USDA's Production & Marketing Administration under authority of the Research & Marketing Act. A copy of the report, *Competitive Relationships Between Sugar and Corn Sweeteners,* may be obtained from the Office of Information Services, Production & Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C.

(Turn page)

Hors d'Oeuvres

• The Florida Citrus Exchange has hired a former Texas Citrus Exchange man to push its sales in the Southwest —normally the Lone Star State's exclusive territory. Courageous men, those Texans.

• *Scientists at GE's research lab, collaborating with bacteriology profs at the State College of Washington, have found that irradiation with high voltage electrons and cathode rays will make sawdust digestible for use in cow feed. Meaning, maybe, we'll be slicing butter with a saw?*

• The British House of Commons has been quite perturbed over appearance, in some of the better London restaurants, of donkey meat. One way, anyhow, of putting a kick in the dull British diet.

• *National Coffee Assn. says that "in the beverage field, the only real aid to constructive self-analysis is found in a cup of coffee." And at the bottom of a cup of tea you find your future. Drink both and you'll know all.*

• The Army's food budget for next year is $603,000,000. Marching on a full stomach comes high these days.

• *With our natural sources of pepper being drastically short, Army chemists are speeding up their efforts to produce a suitable synthetic substitute. While they're about it, how about making the stuff sneeze-proof?*

• Prof. R. C. Baker, Cornell University poultry expert, has recommended "chicken hot dogs" as a way of marketing older birds. Well, we have fishfurters, so why not fowlfurters?

• *Vegetable Grower's Assn. of America came up with this gem to promote National Vegetable Week: "There was a new zing in the zir! It was the crisp cooliscious vitamin powered handsome vegetables." The publicity was definitely not of the common garden variety.*

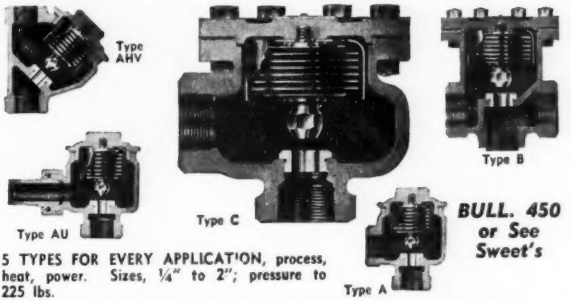
• Englishmen living in Germany are sending food packets to the folks back home. Who won that war, anyway?

In This Plant Nicholson Traps

SAVED 10% IN STEAM COSTS

Chief Engineer H. F. D. stated, after Nicholsons replaced mechanical traps in his plant: "Saving in steam waste cut our fuel cost at least 10%. Yet application temperatures were up 30°-40°. And relief of all air binding effected faster warm-up."

Operate on lowest temperature differential; 2 to 6 times average drainage capacity; maximum air venting. For other advanced Nicholson features send for Bulletin 450.



5 TYPES FOR EVERY APPLICATION, process, heat, power. Sizes, ¼" to 2"; pressure to 225 lbs.

BULL. 450 or See Sweet's

W. H. NICHOLSON & CO., 193 Oregon St., Wilkes-Barre, Pa.

Sales and Engineering Offices in 53 Principal Cities

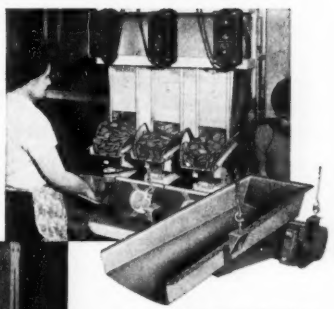
SYNTRON

Provides The Easy, Economical Way To Handle Materials

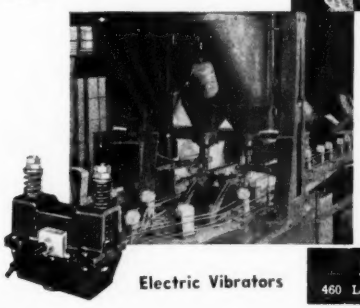
On-the-job reports of Syntron Vibratory Equipment have repeatedly emphasized their cost and time-saving features.

A bakery increased the efficiency and reduced the cost of their vanilla wafer packaging operation by applying Syntron Model F-O Vibratory Feeders.

A Syntron Model V-15 Electric Vibrator, mounted on a packaging machine hopper greatly reduced stoppages due to materials arching and plugging in the hopper.



Vibratory Feeders



Electric Vibrators

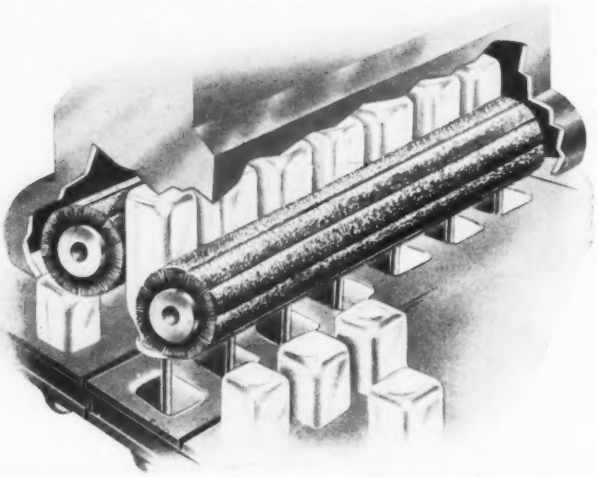
Syntron Equipment is easy to adapt with minimum change to your present processing methods.

Your inquiries on Vibratory Feeders, Electric Vibrators, Hopper Level Switches, Packers and Jolters, etc., are welcome.

WRITE FOR DESCRIPTIVE DATA

SYNTRON CO.
460 Lexington Ave Homer City, Pa.

No Time Lost — REPLACING BRUSHES



Philadelphia Dairy Washes 7200 Bottles per Hour per Machine with FULLERGRIPT BRUSHES

At Abbotts Dairies in Philadelphia, changing brush rolls on a bottle washing machine was a time-consuming operation. It meant opening the bearings and re-aligning a new brush in the bearings. This job could not be accomplished between shifts — consequently, the productive operating time of the machine was cut down.

In 1938 Fullergript brushes were installed. The "lost time" problem was immediately "licked". When replacements are necessary Fullergript strips can be quickly installed between washing runs. The bearings are not touched. Abbotts Dairies has five bottle washing machines in its Philadelphia plants, and each machine is capable of washing 7200 bottles per hour.

Fullergript power brushes are resulting in production economies in many branches of the food industry. For ideas on how Fullergript can help you, send for FREE booklet, "Fullergript Power Brushes". Just write to . . .

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WALTER H. HARTE

Engineer Joins FE Staff

Walter H. Harte, formerly of Minute Maid Corp., has joined the staff of FOOD ENGINEERING in the capacity of Assistant Editor. This addition is a further move to bolster the editorial policy of accenting engineering in the food processing field.

He brings with him six years of experience in food and chemical process design—over four of which were in the frozen citrus concentrate industry.

Mr. Harte was stationed at the main plant of The Minute Maid Corp. in Plymouth, Fla. during the recent evolution of citrus concentrates. There he was involved in the development of the low temperature evaporators, freezers, and other equipment. In addition, he was instrumental in the design of Minute Maid's byproduct facilities, including a revolutionary air suspension dryer for citrus pulp cattle feed. His other business associations were with The Jefferson Chemical Co. and Foster-Wheeler Corp., both of N.Y.C.

Mr. Harte is a junior member of The American Institute of Chemical Engineers and The Florida Engineering Society. He received a B.S. in chemical engineering from M.I.T. in 1945.

Ice Cream Goes Soft

More Americans are asking for "soft ice cream" these days. And the frozen dairy products industry is wondering why.

Generally, soft ice creams—frozen custard, iced milk, and the like—do not meet state requirements setting a minimum of 10 percent butterfat content, for the soft variety usually runs from 4 to 6 percent.

Whatever the story, people are buying more of it, particularly in the Midwest and Far West. While hard

ice cream production fell 24 percent from its peak in 1947 to 1950, the softs (the kind you can squirt out of a freezer right into a cone or cup) have jumped.

People in the huge hard ice cream industry are keeping a critical eye on the trend. Some of them are figuring out new machines to convert their product to soft.

Trawler Freezing

An experiment to freeze fish at sea was completed recently when a trawler equipped with refrigeration machinery and a new type brine-freezer tank returned to port after a successful five-day test trip.

Caught and quick-frozen were 6000 lb. of fish, in this first of a series of tests to determine the relative costs of this and the old method. Many officials of the fish industry are hopeful that it will revolutionize fishing and open new fields of profit and usefulness.

The experiments are being conducted under the direction of Joseph F. Pancochar, chief of the North Atlantic Technological Branch of the U. S. Fish & Wild Life Service.

Offers Maintenance Aid

A productive maintenance kit, designed to assist engineers in setting up maintenance programs, has been prepared for industry by General Electric Co.

This file-size package of maintenance aids is said to minimize lost production time and idleness due to equipment failures, provide better spare parts control, and also make for smoother production flow and hence more output from existing equipment.

Companies List Earnings

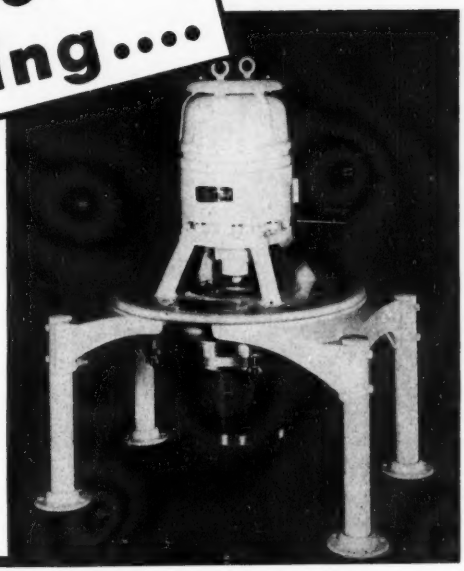
Steeper federal tax payments and record gross sales were noted in the annual statements of several large food manufacturers.

Even with record sales of over $435,000,000, General Mills had a net profit of only $11,520,508—almost $2,000,000 less than last year. Common stock payment was $4.92 per share.

A. E. Staley Mfg. Co., corn and soybean processor, reports a net profit of better than $2,200,000 for the first half of '51, from sales totaling over $80,000,000. However, these figures could have been even greater, said Pres. A. E. Staley, Jr., if cost of the company's basic raw materials were in relation to the price obtained for products.

At the end of its fiscal year, H. J. Heinz Co. showed earnings of $7,423,-

Improved Mixing....



Self-Rising Flour
Prepared Cake Mixes
Enriched Flour
Ice Cream Mixes
Flavorings
Chemicals
Drugs

with "ENTOLETER" High Speed MIXER

HOMOGENEOUS MIXING is now obtainable for food products in faster time . . . at less cost . . . with the "ENTOLETER" Mixer. The "ENTOLETER" Mixer is a new-type centrifugal machine designed to provide thorough mixing and blending . . . in faster time . . . at reduced cost. The saving in mixing time is usually accompanied by a smoother, more intimate mix, permitting improvement in product quality. The high-speed centrifugal action thoroughly disperses materials, producing a remarkably smooth textured product. The Mixer is adaptable to continuous or batch processes.

The "ENTOLETER" Mixer requires only 12 cu. ft., with capacity of 12,000 lbs. of finished mix per hour. . . . where beetle or similar insect infestation may be present, this equipment destroys all stages of insect life. Mail coupon today.

ENTOLETER DIVISION
The Safety Car Heating & Lighting Co., Inc.
P.O. Box 904, New Haven 4, Conn.

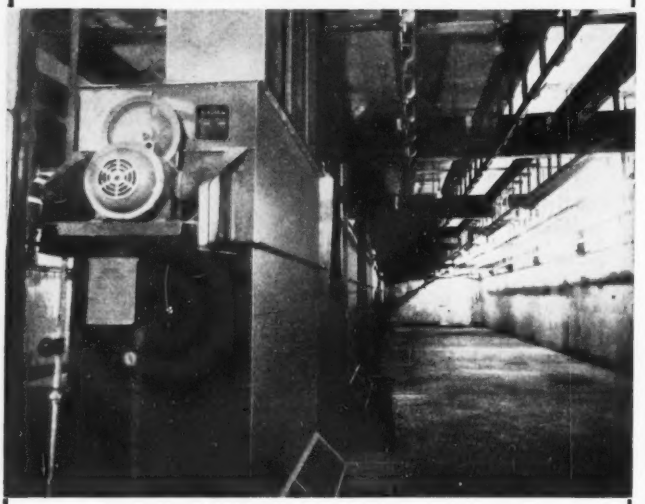
Please send bulletin describing the "ENTOLETER" High-Speed Mixer

Name.....
Company.....
Address.....
City, Zone and State.....

Foreign Distributors: Henry Simon Ltd., Stockport, England

NIAGARA *No-Frost Method*

Increases Production and Improves Quality



A New England firm producing fresh frozen berries installed the Niagara "No-Frost" Method for a capacity of 1,500 pounds of berries per hour. In actual operation, 2,000 pounds per hour were frozen. The operator states that they were the finest frozen berries he had ever produced. There was no spoilage.

Many plants all over the nation have found the Niagara "No-Frost" Method will increase production, get uniform production and produce higher quality products—all helping to increase profits.

Write for Niagara "No-Frost" Bulletin No. 105 for further information.

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

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Field Engineering Offices in Principal Cities

INDUSTRIAL COOLING HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

000 after taxes. Sales were up 11 percent to $189,000,000. Income taxes on all operations represented 52 percent of the net profit, compared with 44 percent last year.

The Borden Co., in its six-month statement, showed a gross 19.6 percent higher than for the corresponding period last year. Estimated profits, however, dropped 3.7 percent.

Milk Concentrate Lags

Concentrated milk, being test marketed in Boston since last March, has hit a low in sales. Trade sources attribute the drop to slackening of original heavy promotion and an increase in price.

Magic Eye Color Sorter

A new electronic lemon sorter has been developed by the University of California, with assistance from the USDA Western Regional Research Laboratory.

Packing-house trials are scheduled for the sorter this season. It is said to separate lemons into such classes as ripe-colored, silver, light green, and dark green.

Basis for operation is that light in the red region of the spectrum is reflected only slightly by immature lemons and almost fully by ripe lemons. Since the sorter is responsive to chlorophyl, it may have other applications.

Perch vs. Perch

F&DA has dropped its case a gainst West Coast fish packers who have been canning rock fish or rose fish under the name "ocean perch". The reason is that leading ichthologists were unable to find enough difference between the fish to warrant a dispute. The Atlantic and Pacific fish are in the same family, but not of the same species.

F&DA will accept "Pacific ocean

"HERE'S OUR UPSIDE-DOWN CAKE DEPARTMENT—"

perch" as a designation for the Pacific coast fish. The word "Pacific", FDA spokesmen say, should serve to distinguish frozen fillets from a similar variety marketed by New England fisheries as "ocean perch."

Big Call for Plastic Film

Increased production of plastic film materials for packaging has been unable to keep pace with demand. And almost 400 million pounds of the film are seen being produced this year—an all time high.

Supply of polyethylene, in particular, is acute. DO orders, equal to 40 percent of total output, plus a rapidly expanding civilian requirement, have created a call three times over present capacity.

Cellophane, acetate film, and Pliofilm producers are all operating at or near peak capacities—being limited only by availability of raw materials.

On the other hand, vinyl films are in good supply, even though 70 percent are slated for defense use.

To Build Down Under

A large factory to produce a variety of canned foods will be erected in Australia by H. J. Heinz Co.

Estimates indicate the plant will cost $4,500,000. The site has been selected at Dandenong, some 20 miles from Melbourne. Production is scheduled to start in 1953.

The company is also undertaking a series of large-scale agricultural experiments to improve quality and yields of crops.

Correction

Trackmobile described in "Just Off the Press" Dept., p. 234 FOOD ENGINEERING, June, 1951, is manufactured by Whiting Corp., Harvey, Ill.

F&DA Food Standards

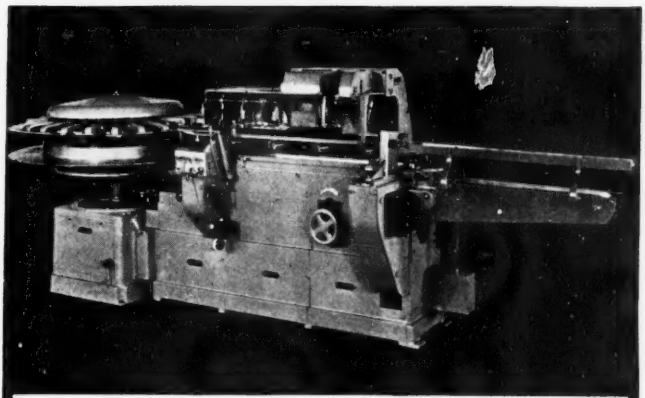
Status of food standards of Food & Drug Administration in early August is reviewed below:

Policy Statement

Mold count in tomato products will continue as an important indication of proper packing procedures, but in addition other kinds of rotten tomatoes that do not have high mold counts should not be used. Adequate sorting and trimming of tomatoes in the packing line will be observed by Food & Drug inspectors, and taken into account in addition to the long established mold-count technic.

Court Decisions

Peanuts or chewing gum, available in vending machines which also con-



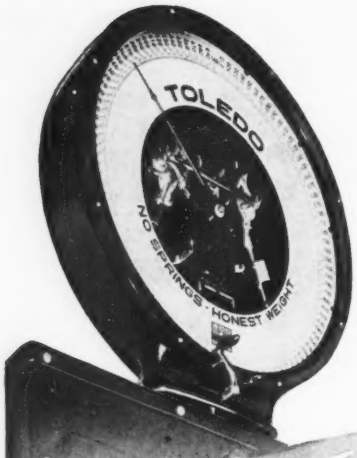
SEALTITE Bag Sealers

CUT BAG CLOSING COSTS

- SEALTITE functions efficiently with any standard gusseted paper bag. No special, premium priced bag is necessary.
- Works with any material usually packed in a paper bag — sugar, salt, flour, coffee, etc.
- Delivers a square, flat-topped, sift-proof package that may be stacked like a carton.
- Settles, shapes and seals 30 to 50 bags per minute.
- Users report production increased and packaging costs reduced as much as $500.00 *per month per machine.*

Write for complete information

CONSOLIDATED PACKAGING MACHINERY CORP.
1400 West Ave., Buffalo 13, N. Y.



1901-1951

50th Anniversary

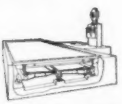
Today, more than ever, you can look to

TOLEDO

to guard your costs better!

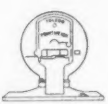
Avoid waste . . . avoid losses through careless handling of food! Tighten your control at every step! See that you have up-to-date scales—and enough scales—throughout your food processing and packing operations! Look into the advantages of Printweigh in stopping losses that originate through human errors. Whatever your problems in receiving, batching, ingredient weighing, packaging, shipping or other weighing . . . operations there's a modern Toledo to do the job with high *accuracy, speed,* and *dependability.*

Today in your community you'll find Toledo as near as your phone; Toledo sales and service offices in more than 200 cities ready to help you in the selection or maintenance of scales vital in guarding your product-quality and costs.


TRUCK SCALES

PORTABLE SCALES

FLOOR SCALES


PRINTWEIGHS

Write for a copy of our 50th Anniversary Brochure . . . helpful information on modern Toledo equipment.

TOLEDO SCALE COMPANY

TOLEDO, OHIO . . . Toledo Scale Company of Canada, Ltd., Windsor, Ontario

HEADQUARTERS FOR SCALES

tain small plastic or metal trinkets, were considered "adulterated" by F&DA in a Norfolk, Virginia case recently. The District Court granted the libel which F&DA requested against Cavalier Vending Corp., agreeing that the mingled trinkets were potentially hazardous to the non-discriminating purchaser (particularly children). However, U. S. Court of Appeals for the Fourth Circuit reversed this decision on July 24, primarily basing their judgment on the fact that trinkets were "not contained in the food." Food & Drug officials plan, in view of the above facts, to ask the Supreme Court for an immediate review of the case.

F&DA was also reversed by Third Circuit Court of Appeals on the "Bireley's Orange Beverage" case. F&DA does plan to ask the Supreme Court to review this action, in the hope that the meaning of the word "purport" can be clarified in the Food, Drug, & Cosmetic Act.

Future Hearings

1. *Canned pineapple and canned pineapple juice,* standards of identity, quality, and fill of container. Postponement of hearing to Oct. 29 still rumored. Proposed standards will be printed soon in *Federal Register.*

2. *Salad dressing,* rehearing on "cream, milk, and milk products" as optional ingredients. F&DA still gathering data; no date has yet been set.

3. *Process cheese* food, hearing on skim milk cheese as optional ingredient. No date yet set.

4. *Canned tuna,* hearing rumored, but no date set; initiative of Administrator.

5. *Frozen vegetables,* hearing rumored but no date set; initiative of Administrator.

Hearings in Progress

Ice cream, new, standard of identity. Scheduled to resume Sept. 5, after summer recess, discussing sherbets, ices, frozen custard, and French ice cream, possibly with some testimony on flavorings, miscellaneous items, and "pharmacologic and other technical evidence concerning surface-active agents."

Tentative Orders Awaited

1. *Residue tolerances,* on fresh fruits and vegetables; new. Expected in late Summer or Fall; hearing adjourned in Sept. 1950; briefs were filed until December.

2. *Margarine,* amendments, standard of indentity. Expected soon; hearing adjourned in April; briefs were filed until May.

(*Turn to page* 197)

TASTE SELLS
CATSUP
YOUR BRAND
PORK SAUSA
EAT LOAF
YOUR BRAND
PICKLES
YOUR BRAND
MAYONNAISE
YOUR BRAND
WIENERS
YOUR BRAND
SOUP
STANGE CREAM-OF-SPICE SEASONINGS
"SILENT PARTNERS IN FAMOUS FOODS"
Before you "Season"—Consult:
WM. J. STANGE CO.,
CHICAGO 12, ILLINOIS . . .
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PROTECTION AND *Beauty*

WHALE — A mammal, not a fish, and the biggest in the ocean. His tough hide and thick, heavy layer of blubber beneath ward off cold and attack.

PARRAKEET — The junior of the parrot family. A clever little fellow with colorful, vivid plumage and sometimes a vocabulary to match.

KVP *Papers* for the FOOD INDUSTRY

The average housewife takes a realistic view towards today's higher food prices. She simply shops more carefully. Food flavor, cleanliness, and wholesomeness are more important than ever. Please her on these counts, and you've won a steady customer.

KVP Papers can help you. They are made especially for food preservation. You can get them in sheets or rolls to protect every product you process. To complete the job, KVP artists and printers can add colorful design whenever it's a sales advantage for you.

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Bread — Cracker
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3. *Canned tomatoes,* amendment, standard of identity. Expected soon; deletion of required label declaration of optional ingredient (a) (3), "the liquid strained from mature tomatoes of such varieties," was considered in approximately two hours on Aug. 7. No opposition to the industry proposal developed. Briefs were due by Aug. 31.

Final Orders Awaited

1. *Bread,* new, standard of identity. Expected soon; effort being made to issue final order as quickly as possible; tentative order published Aug. 1950, exceptions filed in November.

2. *Frozen fruits,* new, standards of identity and fill. Expected soon; tentative order published in Oct. 1950, exceptions filed in Jan. 1951.

3. *Canned mushrooms,* amendment, standards of identity and fill. Expected soon; tentative order published in February; exceptions filed in April.

4. *Fruit preserves, jellies, and butters,* amendment, standards of identity. Expected soon; tentative order published page 7070, July 20 *Federal Register,* setting 25 percent dextrose or glucose syrup solids as maximum portion of optional sweeteners which may be used without label declaration, in harmony with existing F&DA policy for use of optional sweeteners in other foods; written comments received until Aug. 19.

Standards Completed

1. *Canned corn,* new, standards of identity, quality, and fill, Published page 7644, Aug. 4 *Federal Register,* without change from second tentative order published in June; effective Jan. 1, 1952.

2. *Evaporated milk,* amendments, standard of identity. Published page 7819, Aug. 9 *Federal Register,* without change from tentative order published in June; effective Nov. 7, 1951.

USDA Grade Standards

Recent actions by Production & Marketing Administration of USDA on U. S. Grade Standards and related activities include the following:

Canned beets, 5th revision, proposed, page 6870, July 18 *Federal Register,* written comments were received until Aug. 17.

Frozen cauliflower, second revision, proposed, page 6951, July 19 *Federal Register,* written comments were received until Aug. 18.

Processed fruits and vegetables and other processed food products, inspection and certification regulations and fees revised, page 7127, July 21 *Federal Register,* effective July 23. Among processed food products other than

Blueberry packers use conveyor belts to reduce costs

● By washing and automatically sorting blueberries on Cyclone Stainless Steel Conveyor Belt, Eastern growers and processors have eliminated hand sorting, thereby effecting extensive savings in production line labor costs.

Blueberries are only one of hundreds of food products that can be processed at lower cost on Cyclone Metal Conveyor Belts. There's a style, type and size to fit most processing requirements.

Get in touch with the nearest Cyclone sales office for the complete story on Cyclone Metal Conveyor Belts for your plant. And, meanwhile, write for Catalog No. 4.

CYCLONE FENCE DIVISION
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DEPT. H-91, WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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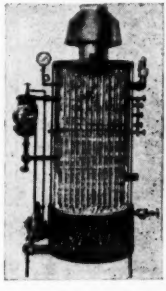
CYCLONE
METAL CONVEYOR BELTS
UNITED STATES STEEL

PERFORMS "SMOOTH AS A CLOCK"

QUICKLY PAYS FOR ITSELF



THE KANE Boiler is built to A. S. M. E. specifications, in sizes to 30 H.P.

The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

the Kane Boiler Package

Here's a truly *"unitized"* steam supply—a compact, self-contained BOILER PACKAGE that is completely automatic . . . requires no attendant and only a bare minimum of floor space. The KANE BOILER PACKAGE includes: the correctly sized Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

ENGINEERED STEAM AT ITS BEST

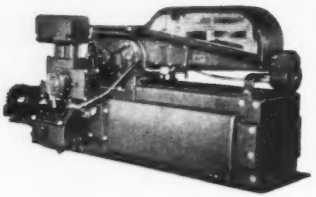
MEARS-KANE-OFELDT INC.

P.O. BOX 223 BRIDGEPORT, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

W&T MERCHEN WEIGH FEEDERS

Give Greater Product Uniformity



Weigh-blending of food ingredients—the only *accurate* way to blend—calls for precision equipment and "know-how".

W&T Merchen Weigh Feeders meet the first of these requirements with these features:

- Feed and weigh in *one* operation
- Handle ounces to hundreds of pounds per minute
- Manual or automatic control
- Easy accessibility
- Handy feed register
- Meet underwriters class II group G specifications

Your W&T Engineer brings you the "know-how" from his experience in designing and supervising hundreds of Merchen Weigh Feeder installations.

Write today or see your W&T Engineer.

M-14

WALLACE & TIERNAN COMPANY, INC.

fruits and vegetables and processed products thereof, covered by these revised regulations, are following: "Honey; molasses, except for stock feed; nuts and nut products, except oil; sugar (cane, beet, and maple); syrups (blended), syrups, except from grain; marine food products, except oil."

Almonds in shell, new, 7195, July 24 *Federal Register*, effective Aug. 23.

Shelled almonds, new, page 7197, July 24 *Federal Register*, effective Aug. 23.

Frozen lima beans, 4th revision, proposed, deadline for written comments extended from May 27 to Jan. 1, 1952, page 7520, Aug. 1 *Federal Register* (refers to page 3621, Apr. 27 *Federal Register*).

Maple syrup, revised, proposed, deadline for written comments extended from July 29 to Jan. 1, 1952, page 7520, Aug. 1 *Federal Register* (refers to page 3487, Apr. 21 *Federal Register*).

Schedule of Events

September

3–13—International Chemical Conclave; Hotel Statler, New York, N. Y.

10–14—Instrument Society of America, 6th national conference and exhibit; Sam Houston Coliseum, Houston, Tex.

19–21—University of Minnesota, dairy products institute; St. Paul Campus, St. Paul.

21–25—American Meat Institute, 46th annual meeting; Palmer House, Chicago.

26–28—American Society of Mechanical Engineers, fall meeting; Hotel Radisson, Minneapolis.

26–29—International Assn. of Milk & Food Sanitarians, annual meeting; Hotel Colorado, Glenwood Springs, Colo.

30–Oct. 3—Tea Assn., annual convention; The Greenbrier, White Sulphur Springs, W. Va.

October

1– 4—Society of Industrial Packaging & Materials Handling Engineers, 6th annual show; Public Auditorium, Cleveland.

8–10—American Oil Chemists Society, fall meeting; Edgewater Beach Hotel, Chicago.

7–10—National Bakery Supply Assn., annual convention; The Greenbrier, White Sulphur Springs, W. Va.

14–18—American Bakers Assn., annual convention; Hotel Sherman, Chicago.

16–19—Second International Congress of Canned Foods; Paris.

22–23—American Butter Institute, annual convention; Drake Hotel, Chicago.

22–24—Packaging Institute, 13th annual forum; Hotel Commodore, New York City.

22–24—International Assn. of Ice Cream Manufacturers, 47th annual convention; Book-Cadillac Hotel, Detroit.

22–25—National Coffee Assn., annual convention; Hotel del Coronado, Coronado, Calif.

24–26—Milk Industry Foundation, annual convention; Hotel Statler, Detroit.

—*End*

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MANAGEMENT INTERNATIONAL EXPOSITION CO.

Engineering Pegs Price

—*Continued from page 87*

racks. Filled racks then go to the packaging station.

Approximately 2,000 lb. of vegetable shortening comprises a charge of frying medium in the cooking tank. It is warmed up by a specially designed tubular heat exchanger, which can be either gas or oil fired. Oil temperature is maintained constant by a unique control system, designed for Siegrist by the local field engineer for the Minneapolis-Honeywell Regulator Co. Main components of this system are a remote-bulb controller and an associated electrically operated fuel control valve.

It also includes an interlocked high-limit safety shut-off to check any accidental high temperature, which could ruin both pies and oil. In addition, a double pushbutton temperature control station allows a special warm-up control setting, as well as product-run control.

An electric motor and adjustable-speed gear train provide a flexible means of driving the rod chain conveyor in the cooker tank. This allows the operator to vary cooker output from the present 160 doz. pies hourly. He needs only adjust the conveyor speed and cooking oil temperature control setting to conform with the product and throughput desired.

Thus, when higher production is required, the adjustments are made and an extra attendant is put on at the finishing end of the cooker, enabling an increase in capacity to, say, 170 doz. hourly.

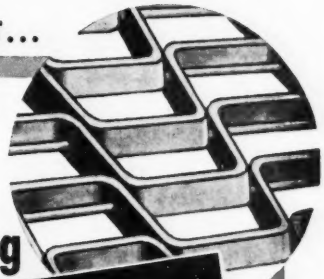
Savings Are Great

In the final analysis, cost figures are the most concise evaluation of any mass production technic. Siegrist's continuous system saves on three scores—in labor, in fuel, and in materials.

It has been found that cooking-oil savings run in the neighborhood of $6,000 per year, based on 30c. shortening. This is estimated from the computed fact that the old batch cooking method used 1 oz. more oil per dozen pies than does the new continuous frying.

Fuel savings have been harder to pin down. However, it is believed that greater heating efficiency and lower radiation losses, as compared to the former small-batch dipping methods, account for considerable fuel economy. In addition, it is generally known that integrated automatic controls—a vital part of the continuous cooker—are efficient fuel savers as well as quality safeguards. (*Turn page*)

from hopper to shipper...



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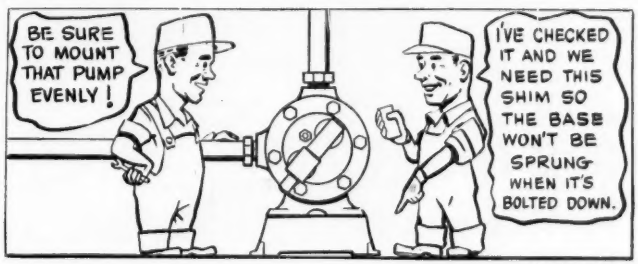

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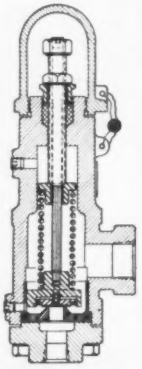

New Valve has Many Advantages: see Frick Bulletin 193.

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Most spectacular savings are those relating to direct labor. With a base labor cost of 75c. per hour for the semi-skilled handling needed in this operation, the per-pie cost in hand manufacturing is about 2.5c. The increased production realized in the company's early mass production technics lowered this to slightly less than 1c. per pie.

However, the new continuous pie cooking has dropped labor costs to slightly more than 1½ mils per pie. Based on a production of 160 doz. pies hourly, and on an 8-mil saving in labor per pie, a labor-cost saving of over $30,000 per year is achieved by the new system as compared with an equivalent output by the previous round-table method.

Since the equipment investment is estimated to be less than $10,000 per installation, it can be readily seen that labor savings alone provide a remarkably quick amortization.

Still Other Benefits

While a very sizable lowering of production costs have allowed Siegrist to keep the market price of its fried pie "budget-low", such a gain has not been at the expense of product quality. Actually, the new forming operation provides a more uniform product—both in size and fill. And the controlled cook provides optimum color and texture that can never be consistently matched by batch methods.

Further, the new operation has provided vastly improved working conditions for plant personnel. Labor turnover has been noticeably less—credited to the greatly reduced accident hazard in the cooking operation. And the actual work load is better balanced due to the adaptability of the continuous line to the most favorable time and motion factors.

End (Resume reading on page 88)

Tanks Are Suspended

—Continued from page 145

highly concentrated loadings could be permitted adjacent to the existing brewery buildings—for this could create differential settlement in the foundations of these structures. And the possible damage to existing buildings precluded the use of piles.

The 56 glass-lined, steel tanks (43 ft. long by 10 ft. dia.) weigh, when filled, about 180,000 lb. each and comprise the major load in the new brewhouse. Normally, such tanks when used in breweries, dairies, and other plants, are mounted on designed pedestals. However, to install them

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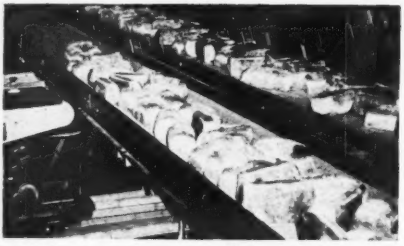

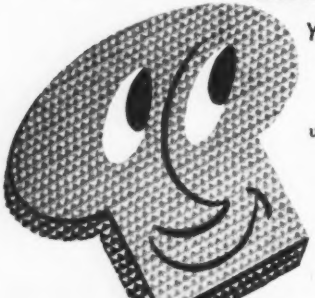

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in this manner in this building would have resulted in excessive load concentrations directly below these tank supports. It was to distribute the load evenly that the two-point suspension was developed.

Straps and Cushions

Each tank is hung by two steel straps (of ½ in. x 12 in. section), which are in turn suspended from girders forming part of the building framework. A lateral brace is attached to the base of each strap to prevent the tanks from swinging. Further, each strap is lined with a ¾ in. amber Neoprene band to provide a cushion for the tank, also to compensate for any irregularities in the ¾ steel tank shell.

Points at which the straps were attached to the girders were located to make the footing loading as uniform as possible. In addition to distributing the tank loads to the building columns, the design also provides distribution of all dead and live loads to give a uniform foundation loading. Footings were planned with as much spread as possible and will support 3,000 lb. per sq. ft.

Tanks slope forward and project through a tile wall (see photo). The angle is adjustable by a turnbuckle device that forms a part of the forward suspension strap. A heavy Neoprene band encircles each tank to separate it from direct contact with the tile wall.

Resistance to earthquakes or other excessive vibrations is a plus-value of this method of supporting tanks.

End (Resume reading on page 147)

Leadership: A New Slant

—Continued from page 70

leader has charge of a group which is essentially untrained and undisciplined —the kind of group you sometimes find in a new department in a plant that is expanding rapidly. The supervisor, or leader, must represent a firm and decisive authority in order to provide the kind of leadership the group needs.

Free rein leadership. A department head is in charge of a highly-trained professional staff, such as a group of research chemists. Cross-communication among the men about the work is undesirable. Although they are working on the same problem, many different solutions are being sought. Therefore, it's unnecessary for the leader to provide much guidance, because implicit in each chemist's training is

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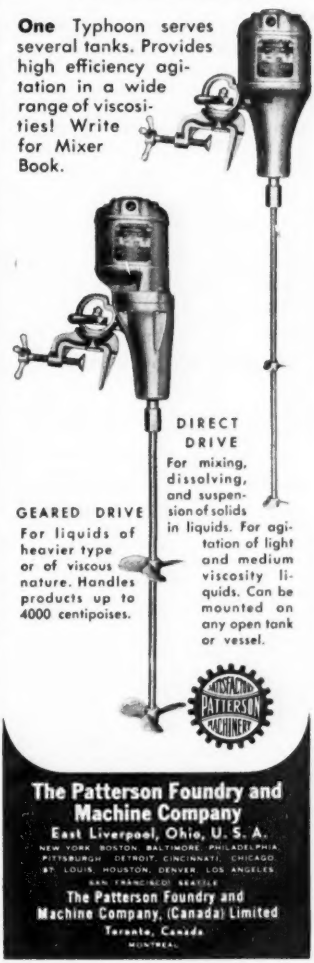

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the knowledge of methods and technics around which his work revolves.

2. The Situation. Let's say a fire breaks out. The leader can't take the time to discuss methods of action. He issues his orders just as fast as possible.

Of course, that's an extreme case. But it's nevertheless true that in any critical situation where there is a need for fast or decisive action, *autocratic leadership* is usually most satisfactory.

On the other hand, the leader who might ordinarily be autocratic tend to adopt a *democratic approach* when for example, he is faced by circumstances he fails to understand or a problem for which he sees no solution. In that case, the alternative of consultation with members of his group is logical.

3. Personality Of the Subordinate. In general, you wi'l find the following factors relating leadership method and type of subordinate:

The insecure individual tends to be dependent on his superior, does better under the firmer hand of an autocratic leader.

The aggressive, hostile type of person also does better under an autocratic leader. His latent hostility must be firmly channelled to confine his activity to constructive purposes.

The aggressive, cooperative individual will function more satisfactorily under a democratic or free rein leader than under an autocrat. Since his self-assertiveness takes constructive paths, he'll head in the right direction when he's on his own.

The individualist or, the "solo player", when he knows his job, is usually most productive under the free rein type of leadership.

These, then, are the tools of leadership, and the methods governing their use. But as is true of any tools, results depend upon how they're applied to a given situation.

Appraising Your Own Performance

Fortunately, where theories fail, practice often provides perfectly sound methods. In other words, regardless of faulty theorizing, many management people instinctively or unconsciously follow this flexible approach. Without being aware of it, they *do* switch their leadership methods to meet the problems at hand.

The starting-point for improving the results of your leadership is an analysis of your present practices. The "test yourself" question box accompanying this article will provide a rough measure of your present leadership skill. Your incorrect answers are likely to indicate leadership weakpoints.

End (Resume reading on page 71)

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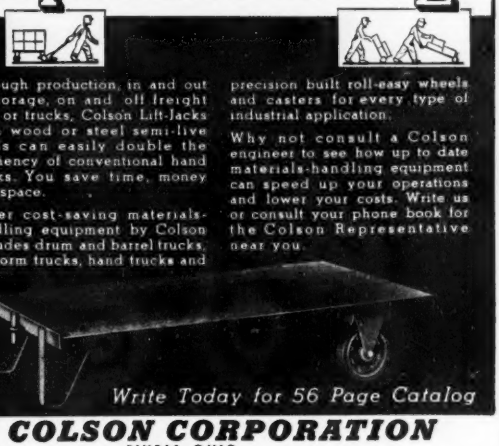

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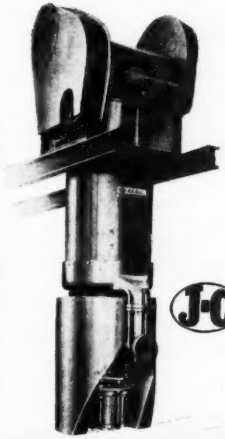

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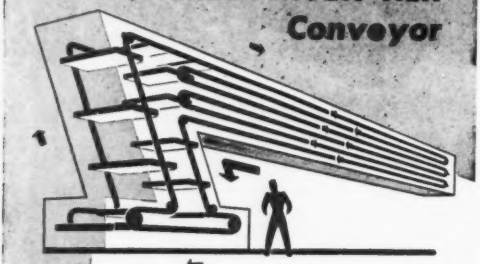

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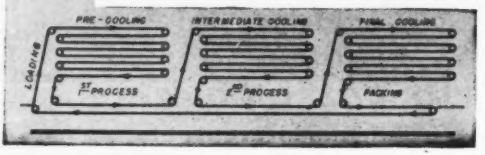

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Allied Frozen Foods, Inc., has been formed in Tampa, Fla., by Nelson Mason, D. M. Pearce and Naomi Burch.

Blaine Canning Co. was recently put into operation at Blaine, Wash. The plant, with a payroll of 30 persons, has a capacity of 1,200 cases of salmon per day.

California Packing Corp., at its regular organization meeting, elected Roy L. Pratt as chairman of the board and Roy G. Lucks as president.

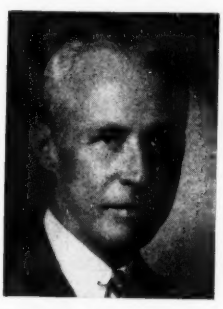
David & Frere Ltd., Montreal, Quebec, will commence production of biscuits and crackers within a few weeks, following completion of its new $1,000,000 plant.

Gerber Baby Foods Co. recently announced that its public relations director, Stephen S. Nisbet, has been elected to the company's board of directors. He replaces Cornelius Gerber, who has retired due to ill health.

Herz-Oakes Candy Co. and **Busy Bee Candy Co.** consolidated operations recently. The firms are merging under the name Herz Busy Bee.

Leslie Salt Co., San Francisco, has announced the organization of Leslie-Scientific Tablet Co. in association with Scientific Tablet Co. of St. Louis.

Medosweet Dairies, Inc., Tacoma, Wash., through three of its executives, has purchased two dairies in Seattle. They are Kristoferson's Dairy and Golden Arrow Farms, Inc. The Seattle operation will be independent of Medosweet.



Walker Hamilton was recently named president of Riegel Paper Corp., producer of glassine and grease-proof papers for packaging and preservation of foods.

Robert I. Garver has been appointed sales and advertising manager for the Certo Div. of General Foods Corp.

John Morrell & Co. will not reopen its flood-ravaged meat-packing plant at Topeka, Kan., due to "economic considerations."

New Era Potato Chip Sales Co., Detroit, has begun production in a new plant in Chicago.

Pacific Mills, Ltd., will build a new converting plant and office building on an 8-acre site near Vancouver Harbor. A new dock will be constructed for barges bringing raw materials from the company's Ocean Falls plant. Output of the new plant will include paper bags, fruit wraps, gum paper, bread wraps, and other specialty items.

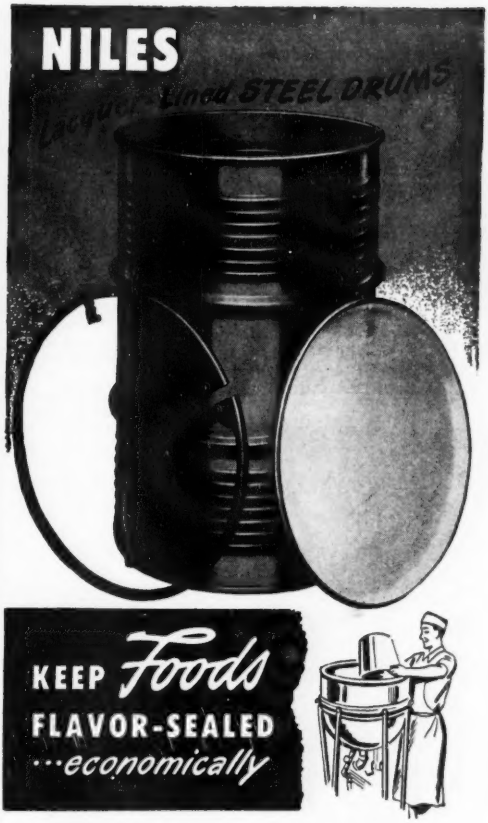
Pillsbury Mills, Inc., through its executive vice-president, P. S. Gerot, has appointed J. L. Rankin as divisional vice-president of grocery products, and H. R. Galbraith as sales manager.

Pineapple Growers Assn. of Hawaii elected the following directors at a meeting in San Francisco: J. W. Speyer; G. R. Ward; R. E. Searby; Randolph Crossley; E. B. Woodworth; G. E. McDearmid; and E. Spaulding, Jr. Elvon Musick was re-elected president for 1951-52.

Quaker Oats Co. has named Thomas Bartel director of employee and public relations.

Tea Garden Products Co., San Francisco, has appointed Philip E. Gilbert new technical director and chief chemist.

Clinton Foods, Inc., has promoted four executive mem-



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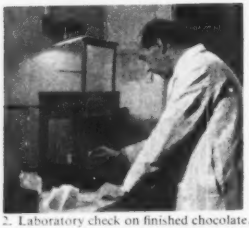
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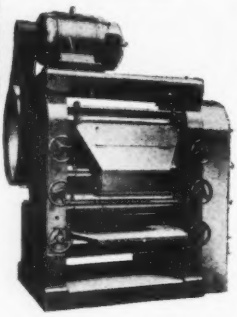

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Dr. I. J. Hutchings, head of H. J. Heinz Co.'s packaging and sterilizing laboratory, has been promoted to manager of food research.

bers of the Corn Processing Div. as follows: R. P. Jurgenson, manager of production; L. H. Peetz, general operating superintendent; H. C. Heidinger, assistant operating superintendent; and Albert Peltzer, milling division superintendent.

Personnel

Charles E. Baker, Jr., has been promoted to the newly created position of plant manager of Robertson & Co., Inc., Roanoke, Va.

Arvid M. Erickson has been appointed vice-president in charge of canning operations in California for Hawaiian Pineapple Co.

George Goldsborough has been appointed to the staff of U. S. Department of Agriculture's sugar branch to assist the cocoa, chocolate and confectionery industries on economic problems.

F. W. Harkleroad was elected chairman of the Wine Advisory Board recently, succeeding L. K. Marshall, who served as chairman for eight years.

John L. Heinlein has been appointed manager of manufacturing for the Central Div. of Continental Can Co.

G. E. Hicks, vice-president of Armour and Company in charge of laboratories, was presented recently with the Legion of Merit for "employment of an effective technic" for controlling and protecting night fighter aircraft against the Japanese in World War II. Hicks at that time was a major in the Marines.

E. C. Johnson, Jr., has been elected president of H. A. Johnson Co., bakers and confectioners supply house, Boston. E. C. Johnson, president since 1920, has been named chairman of the board.

Dr. Roy E. Morse has joined Kingan & Co., Indianapolis, as director of research. Dr. Morse was formerly head of the Food Technology Laboratories of Monsanto Chemical Co.

Arthur A. Mulligan has recently become a member of the sales organization of Phelps Chemical Co., Inc., Brooklyn, N. Y. He will specialize in the company's line of basic flavorings, essential oils and aromatic chemicals.

Fred G. Osthoff is new general sales manager of Fairmont Foods Co., Detroit, Mich. He was formerly district manager in St. Louis for American Home Foods, Inc.

William B. Parshall has been appointed product manager of Durkee-Elmhurst Products. He succeeds Herbert A. Rice, who is leaving to organize his own distributing business as Durkee representative in the Northern Ohio area.

Joseph S. Pickett, production superintendent of Atlas Brewing Co., Chicago, has been elected president of Siebel Institute Alumni Assn.

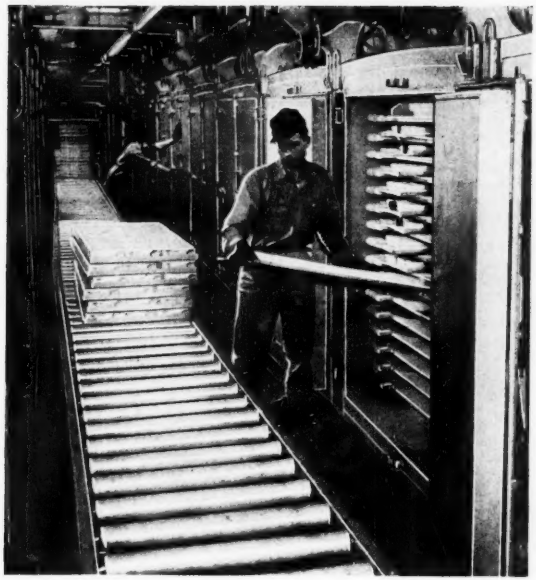
W. Grason Winterbottom, Sr., was recently elected chairman of the board of Phillips Packing Co., Inc., Cambridge, Md.

Associated Industries

American Cyanamid Co. has consolidated its several warehouse and office locations in Chicago and St. Louis into one newly constructed building in each city.

V. E. Anderson Co. has recently named three engineering executives to conduct development work on high efficiency purifiers. Company will shortly introduce a puri-

Dr. Robert W. English is new director of education at the American Institute of Baking.



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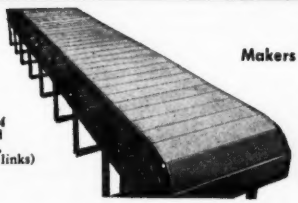

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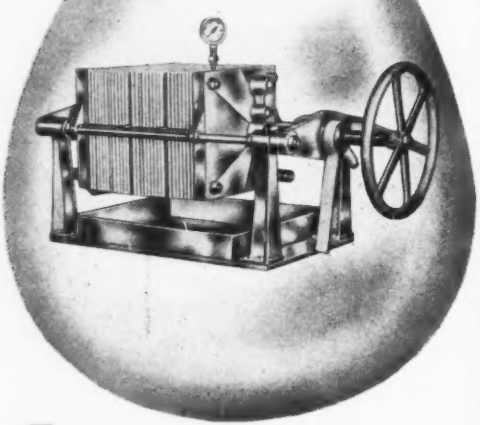

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fier reported to have wide application in the food field.

Atlas Mineral Products Co. has announced the following promotions and appointments: Edison C. Sickman, general sales manager; Earle A. Erich, head of technical service activities; and George Gabriel, plant manager.

Barry-Wehmiller Machinery Co., St. Louis, recently acquired all the physical assets, except land and buildings, of the Edward Ermold Co., New York.

DeLaval Steam Turbine Co. has announced four executive promotions: James P. Stewart has been elected president; Wencel A. Neumann, Jr., has been named vice-president of industrial sales; and H. G. Bauer and Charles A. Jurgensen have been elected, respectively, vice-presidents of engineering and of manufacturing.

Diamond Alkali Co. has disclosed plans for an expansion project at its silicate of soda plant in Dallas, Tex. The new project calls for installation of a large furnace to supplement production of three smaller type furnaces now in operation.

Diversey Corp. has named Frederick B. Hermann director of the technical development department. He was formerly the department's assistant director.

Fisher Scientific Co. has recently named Dr. Samuel W. Levine as director of development.

B. F. Goodrich Co. has completed construction of a $5,000,000 industrial belting plant claimed to be the most modern in the world. The new paint will enable the company to meet demands for a larger conveyor belt to handle heavier loads.

Hammond Bag & Paper Co., Wellsboro, W. Va., has been busy completing a new multiwall paper bag plant at Pine Bluff, Ark. The new facility was slated to be in operation by the time this issue reaches readers.

High Voltage Engineering Corp., Cambridge, Mass., has announced the appointment of Dr. Davis R. Dewey as vice-president. His responsibilities will include direction of the company's sales program.

Lynch Corp. has named Joseph P. McCarthy and R. L. Sears, respectively, as general manager and sales manager of the company's Ohio divisions, located in Toledo and Defiance, Ohio.

Frank R. Plum has been elected divisional vice-president and general manager of the bakery division, American Machine & Foundry Co.

Paramount Paper Products Co., Omaha, has completed a one-story printing plant for the purpose of servicing distributors and product users with gummed tape and labels.

Pressed Steel Car Co. has acquired the Chicago Steel Tank Co., with its two subsidiaries, and the Solar-Sturges Mfg. Co.

Reeves Pulley Co., Columbus, Ind., is expanding its facilities on the West Coast by establishment of an assembly plant in San Francisco. R. G. Sullivan will be in charge of operations.

Kennedy Equipment Corp., Roselle Park, N. J., has purchased Industrial Corp., Brooklyn, N. Y. The latter company, a manufacturer of dehumidifiers and air drying equipment, will retain its name and identity.

United States Steel Supply Co. has appointed S. D. Flinn as controller, succeeding F. L. Warnke, who will move to the Pittsburgh office.

Deaths

Hugh Antrim, 81, senior partner in the firm of C. W. Antrim & Sons, coffee and tea processors, Richmond, Va.—July 22.

Jules Godchaux, 78, director and executive vice-president, Godchaux Sugars, Inc., New Orleans—July 5.

William C. Johnson, 49, executive vice-president, Allis-Chalmers Mfg. Co.—July 26.

James C. Lee, 56, president, Buffalo Rock Bottling Co., Birmingham, Ala.

Raymond S. Miller, 61, secretary-manager, Western Creamer Operators Assn., Seattle—June 28.

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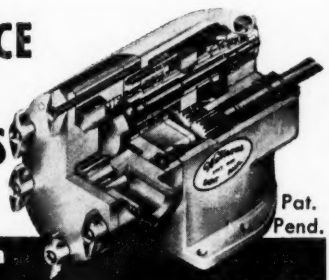

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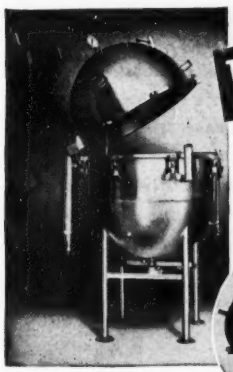

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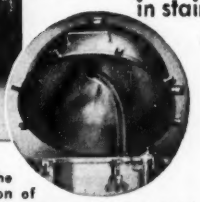

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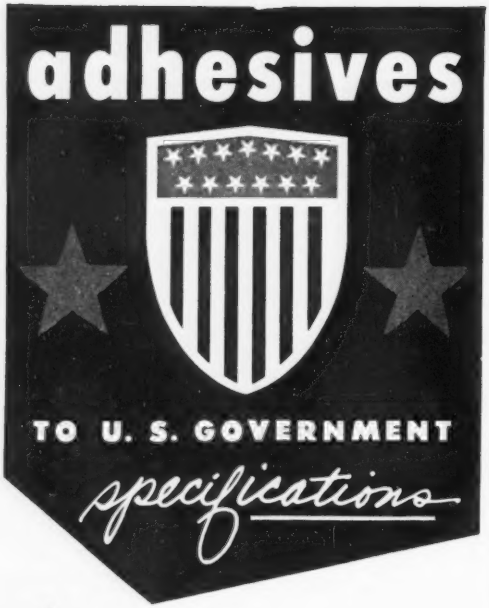

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Recent Inventions

Method of Treating Coffee Beans to Preserve Flavor and Aroma by Coating With Raw Egg Paste—*J. L. Kellogg, Chicago, to H. L. Kellogg, executrix.* No. 2,539,626. *Jan. 30, 1951.*

Babcock Test Mixer With Motor-Driven Elliptically Tracelling Plate—*G. F. Massey, Fond du Lac, Wis.* No. 2,539,851. *Jan. 30, 1951*

Process for Altering Flavor of Cereals by Treating Batch Intermittently With Wet Steam Under Pressure—*E. G. Huzenlaub, Brentford, and F. H. Rogers, Elmhurst, Kenley, England to Mars and Huzenlaub, Chicago.* No. 2,539,999. *Jan. 30, 1951.*

Machine for Extracting Citrus Juice With Rotary Severing Elements Located to Feed Fruit Directly Into Rolls—*R. R. Smith, Vallejo, Calif.* No. 2,540,014. *Jan. 30, 1951.*

Machine for Orienting Peaches and Like Fruit With Cleft and Suture Aligned by Spinning Principle—*L. W. Waters, Ontario, Calif. to Atlas Imperial Diesel Engine Co., Oakland, Calif.* No. 2,540,020. *Jan. 30, 1951.*

Method of Making Cream Style Corn by Flotation and Rod Shaking Cleaning—*W. J. Fitzpatrick, Chicago.* No. 2,540,028. *Jan. 30, 1951.*

Food Cooker of Dieletric Type With Special Method of Coupling Wave Energy Into Food Body by Polystyrene Rod—*P. L. Spencer, West Newton to Raytheon Mfg. Co., Newton, Mass.* No. 2,540,036. *Jan. 30, 1951.*

Machine for Transferring Jars From an Inclined Chute Onto a Horizontal Spaced Conveyor—*R. F. Zimpel, Canajoharie, N. Y. to Beech-Nut Packing Co., Canajoharie.* No. 2,540,181. *Feb. 6, 1951.*

Method of Sterilizing Liquids by Direct Electric Current and Contact With a Solid Porous Conducting Body—*J. A. Tolman, Los Angeles.* No. 2,540,223. *Feb. 6, 1951.*

Sugar Crystallizer With Plurality of Heat Transfer Coils in Series and a Continuous Helical Stirrer Scroll—*H. H. Feldstein, and H. R. Kilby, East Cleveland.* No. 2,540,250. *Feb. 6, 1951.*

Vitamin-Enriched Farinaceous Material Containing Thiamin-Tannate-Gelatin Complex—*P. G. Stecher and W. R. Jackson, New York City to Merck & Co. Inc., Rahway, N. J.* No. 2,540,302. *Feb. 6, 1951.*

Food Container Consisting of Two Identical Half Members With Perforated Lines for Folding—*D. J. Moore, Chicago.* No. 2,540,342. *Feb. 6, 1951.*

Method and Apparatus for Extracting Juice From Whole Citrus Fruit Under Inert Gas Atmosphere—*W. A. Pipkin, Safety Harbor, Fla.* No. 2,540,345. *Feb. 6, 1951.*

Packing Machine With Means for Feeding a Bag Over Discharge End of Chute Carrying Vegetables and Common Means for Discharging Vegetables Into Bag and Filled Bag From Unit—*P. R. Pretzer, Brooklyn Heights, Ohio, to W. F. Pretzer.* No. 2,540,489. *Feb. 6, 1951.*

Mechanism for Packaging Cheese With Integrated Product Pump, Movable Filling Spout, Filler Valve and Conveyor—*H. A. Stine, Fontana, Wis. to Kraft Foods Co., Chicago.* No. 2,540,557. *Feb. 6, 1951.*

Apparatus for Opening and Filling Bags With Automatically Operated Feed Valve Actuated by Tilt Switch—*M. J. Harrington, Cleveland, and S. E. Hammer, Eagleville, Pa.* No. 2,540,615. *Feb. 6, 1951.*

Flexing Disk Fruit Stemming Machine and Conveyor for Cherries and Like—*W. W. Kelly, Portland, Ore. to Food Machinery & Chemical Corp.* No. 2,540,740. *Feb. 6, 1951.*

Cardboard Bottom Feed Mechanism for Loading Conveyor of Food Wrapping Machine—*J. W. Smith, Battle Creek, Mich. to Battle Creek Bread Wrapping Machine Co.* No. 2,540,762. *Feb. 6, 1951.*

Cheese Packaging Method Utilizing Two Moisture-Vapor-Proof Wrappers Ununited and Unsealed but Heat-Shrunk to the Cheese—*E. E. Eldredge, Plymouth, Wis. to The Borden Co., New York City.* No. 2,540,815. *Feb. 6, 1951.*

Fish Canning Machine With Means of Advancing Individual Fish Masses Through a Tunnel Wall Opening to the Can—*C. G. Preis, Forest Hills, N. Y. to American Can Co., New York City.* No. 2,541,097. *Feb. 13, 1951.*

Process for Canning and Sterilizing Food Products Utilizing Superatmospheric Pressures to Heat, Cool, Fill in Sterile Containers

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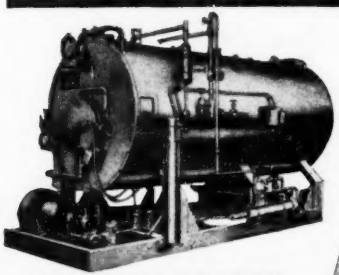

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and Hold to Complete Sterilization—*H. J. Smith, Richmond, Va. and C. O. Ball, Maumee, Ohio, to Food Processes Inc., Richmond, Va. No. 2,541,113. Feb. 13, 1951.*

Rectangular Tray-Type Package With Moisture-Vapor and Grease-Resistant Coating and Grease Resistant Cover Wrapper—*G. A. Moore, New York City to National Biscuit Co. No. 2,541,173. Feb. 13, 1951.*

Method of Preserving Spray-Dried Milk by Replacing Oxygen Within and Around Particles With Inert Gas—*P. F. Sharp, Piedmont and A. J. Wasson, San Francisco, to Golden State Limited Co. No. 2,541,441. Feb. 13, 1951.*

Apparatus for Slicing, Separating and Conveying Fish Loins Preparatory to Canning.—*F. Skoog, Olympia, Wash. No. 2,541,442. Feb. 13, 1951.*

Process for Treating Onions Consisting of Slicing, Dehydrating, Rehydrating to 5 Percent Liquid, Deep-Fat Frying, and Centrifuging to Dryness—*B. H. Karmen, Chatsworth, Calif. to A. Getz. No. 2,541,701. Feb. 13, 1951.*

Process for Making Corn Meal Porridge by Intermittently Agitating Corn Meal in Water Until Residual Water is Clear, Heating, Holding, Canning and Pressure-Cooking—*C. J. Walker, Indianapolis, Ind. No. 2,541,730. Feb. 13, 1951.*

Process for Making Canned Gelatin by Adding Proportioned Amounts of Water, Granulated Gelatin, Flavor, Color, Salt, Sugar and Acid, Filling With Hot Water, Sealing the Can, Heating and Cooling—*C. J. Walker, Indianapolis, Ind. No. 2,541,731. Feb. 13, 1951.*

Process for Dehydrating Apples Comprising Slicing, Air-Drying to 16-24 Percent Moisture, Then Air-Drying at Elevated Temperature to 6 Percent Moisture—*R. W. Callaghan and L. W. Berglund, Minneapolis, Minn. to General Mills Inc. No. 2,541,859. Feb. 13, 1951.*

Process for Preparing Defatted Dry Soluble Coffee by Extracting Ground Roasted Coffee Aromatics and Fat With Organic Solvent, Separating and Adding Aromatic Portion to Dried Aqeous Infusion of the Defatted Coffee—*H. M. Cole, Belmar, N. J. to General Foods Corp., New York City. No. 2,542,119. Feb. 20, 1951.*

Apparatus for Canning Fish Fillets Consisting of Forcibly Compacting Equal Masses of Fish—*J. Gorby, Los Angeles. No. 2,542,133. Feb. 20, 1951.*

Art of Packaging Nuts Involving Replacement of Air in Container With Inert Gas Through Novel Package Design—*E. G. Nichols, Winchester, Mass. to E. F. Kemp Corp., Somerville, Mass. No. 2,542,206. Feb. 20, 1951.*

Cake Dough or Batter Depositer Which Automatically Extrudes and Cuts Off Fixed Quantities of Product in Continuous Fashion—*E. O. Engels and H. F. Tiedke, Saginaw, Mich. to Baker Perkins Inc., Saginaw, Mich. No. 2,542,239. Feb. 20, 1951.*

Apparatus for Washing and Brining Fish and Other Foodstuffs Consisting of a Tank and Product-Removing and Elevating Conveyer—*M. P. Vucassovich, Beverly, Mass. to E. Renneburg & Sons Co., Baltimore, Md. No. 2,542,382. Feb. 20, 1951.*

Modified Milk Product Containing Reduced Proportions of Sodium, Potassium, Lactose and Chlorine and Increased Proportions of Protein and Calcium—*F. K. Daniel, Kew Gardens, N. Y. to Sun Chemical Corp., New York City. No. 2,542,633. Feb. 20, 1951.*

Sausage Forming Machine Consisting of a Continuous Molding Arrangement Within a Frame—*F. A. Hedwall, Sacramento, Calif. No. 2,542,673. Feb. 20, 1951.*

Confectionery Extruding Apparatus With Two Sets of Opposed Screw Conveyers Moving Material Through an Adjustable Orifice Slot—*L. W. Mahle, Abington, Pa. to Frank H. Fleer Corp., Philadelphia. No. 2,542,691. Feb. 20, 1951.*

Process for Recovering Proteins From Leaves and Stems of Chlorophyll-Bearing Plants Consisting of Fermenting With *Clostridium Roseum* and Recovering Material From Mash—*J. Naghski, J. W. White, Jr. and S. R. Hoover, Philadelphia. No. 2,543,049. Feb. 27, 1951.*

Process for Manufacturing Commercial Chocolate by Crushing Nibs and Adding Sugar and Additional Cocoa Butter to Extract and Adding Proportion of Mixture to Residual Nib Mass—*A. L. Verdier, Paris, France. No. 2,543,209. Feb. 27, 1951.*

Process for Recovering Wheat Mill Starch By Centrifuge Separation, Diluting Underflow and Recentrifuging—*H. Ferrin, Keokuk, Iowa, to General Mills Inc. No. 2,543,281. Feb. 27, 1951.*

Machine for Crushing and Stemming Grapes Consisting of Rotating Drum and Rotating Inner Shaft With Spiders and Paddles—*A. Ferrari, Healdsburg, Calif. No. 2,543,571. Feb. 27, 1951.*

Method of Producing Starch From Maize-Starch Milk by Double Centrifuging Underflow, Concentrating First Overflow and Adding This to Second Overflow, Purifying and Subjecting to Final Separation—*C. G. Eckers, Stockholm, Sweden to Aktiebolaget Separator, Stockholm. No. 2,543,660. Feb. 27, 1951.*

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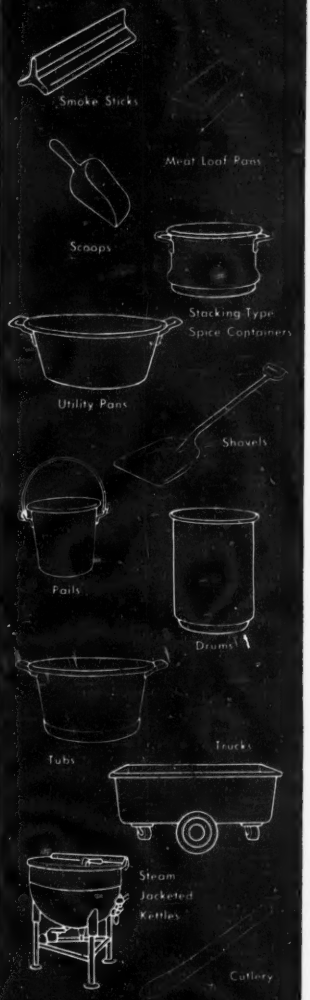

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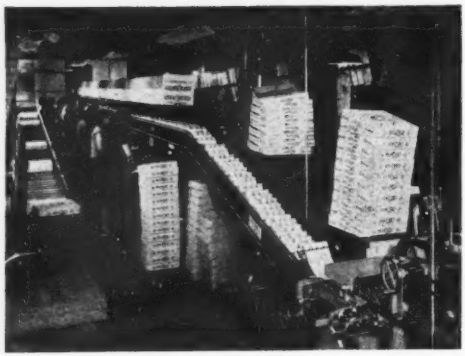

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Enclosed in Plastic-Treated Tube to Prevent Escape of Fungicide—*F. R. Linda, White Plains, N. Y., to St. Regis Paper Co. N. Y. No. 2,543,853. Mar. 6, 1951.*

Method of Treating Citrus Fruit to Facilitate Peeling Through Mutilation of Outer Peel to Expose Albedo and Heating in Water to Wilt Albedo—*R. Polk Sr. and R. Polk Jr. to Polk Development Co., Tampa, Fla. No. 2,543,932. Mar. 6, 1951.*

Device for Seasoning Meat Consisting of a Point for Horizontal Insertion, Stem and Reservoir for Seasoning Liquid—*V. W. Higgens, Essex, Conn. No. 2,544,316. Mar. 6, 1951.*

Method of Preparing Corn Involving Cutting Whole Kernels From Cob, Cleaning and Adding Liquid and Slitting a Portion of Kernels in Liquid—*W. J. Fitzpatrick, Western Springs, Ill., to W. J. Fitzpatrick Co., Chicago. No. 2,544,380. Mar. 6, 1951.*

Machine for Feeding and Twisting Strip Candy—*G. H. Keller, Helena, Ark. to R. E. McCormack, Albany, Ga., (one-half to assignee). No. 2,544,502. Mar. 6, 1951.*

Process for Manufacturing Cheese Involving Separating Curd from Bulk of Whey, Rotating Curd in Atmosphere to Produce Folding and Dropping With Simultaneous and Periodic Breaking-Up of Curd, Holding and Draining—*D. M. Greer, Hinsdale and J. L. Zmk, Chicago, Ill., to Armour and Company. No. 2,544,672. Mar. 13, 1951.*

Process of Conditioning Meat Involving Electrical Stimulation of Muscle Tissue Promptly After Slaughtering—*A. Harsham, Cincinnati, and F. E. Deatherage, Columbus, Ohio, to The Kroger Co., Cincinnati. No. 2,544,681. Mar. 13, 1951.*

Apparatus and Method for Tenderizing Meat Utilizing Short Electrical Impulses Between 1,750 and 3,000 V. Immediately After Slaughtering and Bleeding—*H. C. Rentschler, East Orange, N. J., to Westinghouse Electric Corp., E. Pittsburg, Pa. No. 2,544,724. Mar. 13, 1951.*

Juice Extracting Apparatus for Fruits and Vegetables Comprising Screw Feed, Screen Enclosed Breaking and Holding Chamber With Rotor and Hammer Arms—*L. McGihon, San Leandro, Calif., to King Sales & Eng. Co. No. 2,545,159. Mar. 13, 1951.*

Patty Forming Machine Containing Two Paper Rolls Between Which Ground Meat Feeds Into Mashing or Flattening Throat to Form Patties With Paper Covering—*F. S. Elsaesser, Cincinnati, Ohio. No. 2,545,451. Mar. 20, 1951.*

Apparatus for Recovery of Crab Meat From Bony Material by Gravity Liquid Separation in Conveyor-Fed Tank—*S. G. Harris and R. H. Carrington, Beaufort, S. C. to The Blue Channel Corp., Port Royal, S. C. No. 2,545,517. Mar. 20, 1951.*

Malting Plant and Means for Moving and Aerating Grain Consisting of a Room, Malting Compartments and Bucket Conveyor System—*H. F. V. Bodcher and E. J. von Heidenstam, Stockholm, Sweden. No. 2,545,542. Mar. 20, 1951.*

Process of Purifying Citrus Juices Involving Removing Froth From Juice Film Under Vacuum and Separating Juice Beneath Froth Without Agitation—*W. R. Ketchum, Phoenix, Ariz. No. 2,545,581. Mar. 20, 1951.*

Machine for Skinning Meat Involving Stationary Clamp and Endless Belt Conveyor Whereon Meat Advances and Rotates—*W. F. Weber, Chicago, to Armour and Company. No. 2,545,718. Mar. 20, 1951.*

Continuous Emersion-Type Food Cooker With Submerged Heating Tubes and Means for Longitudinal Expansion and Contraction—*F. M. McBeth, Harrisburg, Pa., to Macbeth Engineering Corp. No. 2,546,163. Mar. 27, 1951.*

Retarding Yeast Growth in Stored Sugar Syrups by Maintaining Layer of Material on Surface of Syrup to Prevent Access to Air—*D. V. Wadsworth, Plandome, N. Y., and W. L. Owen, Baton Rouge, La., to Refined Syrups & Sugars, Yonkers, N. Y. No. 2,546,178. Mar. 27, 1951.*

Process of Handling Unrefined Sucrose by Concentrating to High Density Solution, Adjusting pH to 6-7.5 and Adding Non-Reacting Preservative—*H. S. Paine, Dobbs Ferry, N. Y., and M. F. Hughes, Jersey City, N. J., to Refined Syrups & Sugars, Yonkers, N. Y. No. 2,546,179. Mar. 27, 1951.*

Continuous Hamburg-Steak Patty Forming Machine Comprising Grinder, Moving Belt and Paper Layer, Patty Forming Means, and Cutter—*F. S. Elsaesser, Cincinnati, Ohio. No. 2,546,497. Mar. 27, 1951.*

Process for Drying Yeast Solids From Dilute Slurries by Film Evaporation and Subsequent Roller Drum Drying—*S. L. Baker, Loveland, Ohio, to Institutum Divi Thomae Foundation, Cincinnati. No. 2,546,251. Mar. 27, 1951.*

Process for Preparing Blended and Deodorized Product of Fat and Hydrogenated Oil Utilizing Specially Arranged and Modified Apparatus Comprising Hydrogenating, Deodorizing and Blending Tanks—*B. S. Harrington, Chicago, to Armour and Company. No. 2,546,502. Mar. 27, 1951.*

—End

Sharper Flavor Ratings

—Continued from page 73

or aroma appeal. The samples were then re-coded and the aroma and flavor notes evaluated. The notes detectable in these pound cakes are listed below in order of appearance:

Aroma	Flavor
Sweet	Sweet
Vanilla	Vanilla
Egg	Egg
Butter	Butter
Fruity	Salt
Nut Caramel	Fruity
	Nut Caramel

Numerical ratings for these various notes, with definitive evaluations, follow:

0 Not detectable
1 Just detectable
2 Moderate
3 Moderately strong
4 Strong
5 Very strong

In order to obtain the most reliable final values for our flavor profiles, the final panel results for each bake were averaged by types of flavor. The final flavor profile results are presented in an accompanying table and in the profile diagrams (Figs. 2 and 3).

The average results showed that the pound cake containing the blended vanilla-type flavor had the best aroma and flavor appeal 24 and 72 hr. after baking. The pure vanilla extract had better flavor appeal 24 hr. after baking than the vanillin-coumarin blend. After 72 hr., the cakes made with pure vanilla extract were rated poorest, vanillin-coumarin cakes second, and blended vanilla-type cakes best.

It should be noted, however, that there are only relatively small differences between the corresponding aroma and flavor-note strengths in all of the profiles. This shows both the consistency of the panel and the general similarity of the cakes tested.

Of the three vanilla flavoring agents tested, the carefully blended vanilla-type flavor was the most satisfactory for pound cake. The resulting flavor and aroma were slightly better than those with pure vanilla or the vanillin-coumarin blend when the cakes were fresh. Three days after baking, the blended vanilla-type flavored cakes were noticeably better than other cakes, showing that in pound cakes this flavoring agent maintains its strength and quality for a longer period of time than the other flavoring agents tested.

References

1. Bengtsson, K. and Helm, E., "Principles of Taste Testing." *Wallerstein Lab. Commun.* 9, 28, 171-180, 1946.

2. Cartwright, L. C. and Nanz, R. A., "Comparative Evaluation of Spices." *Food Technol.* 2, 4, 30-336, 1948.

3. Cartwright, L. C., Snell, C. T. and Kelley, P. H., *Organoleptic Panel Testing As a Research Tool*, Paper No. 7, Sept. 18, 1949, at 116th Meeting of American Chemical Society at Atlantic City.

4. Crist, S. W. and Seaton, H. L., "Reliability of Organoleptic Tests." *Food Res.* 6, 529-536, 1941.

5. Crocker, E. C. and Platt, W., "Food Flavors, A Critical Review of Recent Literature." *Food Res.* 2, 183-196, 1937.

6. Dove, W. F., "Food Acceptability—Its Determination and Evaulation." *Food Technol.* 1, 1, 39-50, 1947.

7. Metzner, C. A., "Investigation of Odor and Taste." *Wallerstein Lab. Commun.* 6, 17, 5-18, 1943.

8. Wood, C., "Organoleptic Tests in the Food Industry: III Some Statistical Considerations in Organoleptic Tests." *J. Soc. Chem. Ind.* 68, 128-183, 1949.

9. Cairncross, S. E. and Sjostrom, L. B. *Flavor Profiles . . . A New Approch to Flavor Problems.* Presented July 13, 1949, Ninth Annual Conference of Institute of Food Technologists.

10. *Flavor.* Brochure Published by Arthur D. Little, Inc.

11. "Flavor Profile Describes Food Flavors in Easily Understandable Terms." *Food Processing*, May, 1950.

End (*Resume reading on page 74*)

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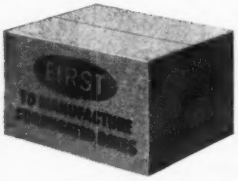

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A variety of cold-air freezers for quick freezing products under low-temperature refrigeration are presented in Bulletin 147C. Illustrations and diagrams are included.—*Frick Co., Waynesboro, Pa.*

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Subject of 8-page bulletin is precision salting unit which eliminates brine tank and tablet applications. Reported advantages are low cost and uniformity of salt and sugar content.—*Warden Salt Co., Industrial Div., Chicago.*

Process Machinery

Illustrated and described in 8-page Bulletin 52 is diversified line of attrition mills, pulp refiners, hammer mills, crushers, breakers, magnetic and gravity separators, cleaners, defibrators, exhausters, and similar processing machinery.—*Bauer Bros., Springfield, Ohio.*

Liver Sausage Production

Production information and formulas for a complete range of liver sausage products, as well as canned liver items, are offered in plastic-bound booklet. Included is a list of cures, binders and flavor builders for liver products. —*Basic Food Materials, Inc., Vermillion, Ohio.*

Vegetable Oil Clarification

Report details pressure leaf filtration system for clarification of vegetable oils. Outlined is information on filter construction, principle of operation, and other data. —*Hercules Filter Corp., Paterson, N. J.*

Mud Filter

Cane sugar processors are addressed in 16-page Bulletin 215-R that depicts filter for handling cane muds. Economic and operating advantages, claimed in installation, include lower sucrose loss in filter cake, less wash water to be evaporated, higher purity of filtrate, and continuous, rather than intermittent, operation. — *Oliver United Filters, Inc., 33 West 42nd Street, New York 18.*

Homogenizer

Fold-out leaflet gives description of new homogenizer with capacities from 1,000 to 20,000 lb. per hr. Illustrations and chart giving floor space requirements are included.—*B. Trudel & Co., Montreal, Can.*

Roll Machine

Leaflet details A&F Union Model "D" roll machine. Unit divides and rounds dough pieces from ¼ oz. to 5¼ oz. and has three optional discharge positions to roll conveyor and molder. Advantages cited are centralized controls, liftout, ventilated panels for easy cleaning, and convenient hand loading from overhead chutes.—*American Machine & Foundry Co., 485 Fifth Ave., New York City 17.*

Sifter

Specifications of all-metal sifter with self-contained drying mechanism are given in Bulletin 06B7625. Unit weighs 400 lb. and is designed to accommodate 3, 4 or 5 sieves.—*Allis-Chalmers Mfg. Co., Milwaukee.*

Turbine Drive

Featured in Publication GEA-5692 are single and multi-stage turbine drives for sugar mills. Photos, sketches and line drawings show turbine applications and operation.—*General Electric Co., Schenectady 5, N. Y.*

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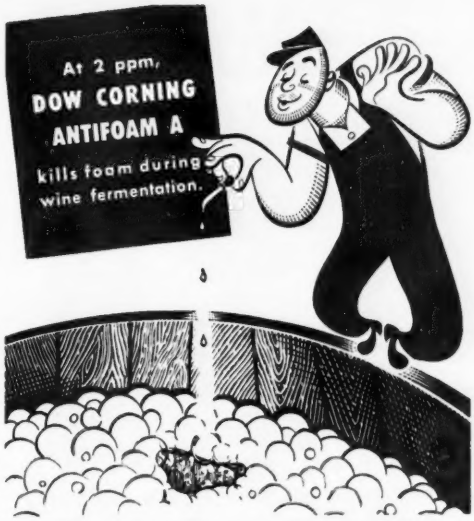

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Report indicates how head type fluid meter installations are simplified through adoption of uniform practices in the fabrication of their seal and condensate chambers. Three methods of fabrication are indicated with drawings. —*Instrument Society of America, Pittsburgh 12, Pa.*

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Described and illustrated in 8-page bulletin are dial-type temperature indicating and recording thermometers of standard designs. Featured is wide selection of dial ranges, fittings, and direct or distant mountings.—*Auto-Lite Co., Toledo 1, Ohio.*

Strip Chart Control

Engineering data on strip chart pneumatic control potentiometer are provided in Specification Sheet No. 175.—*Minneapolis-Honeywell, Brown Instrument Div., Philadelphia 44.*

Air Pollution Detector

Set forth in 8-page bulletin are details of unit, called Autometer, for detection of air pollution by SO_2. Illustrations and diagrams are included.—*Leeds & Northrup Co., Philadelphia 44.*

Magnetic Drive

Information on "Regutron", speed control magnetic drive and magnetic amplifier is furnished in 32-page Catalog 1107. Application of unit is covered through use of charts and diagrams.—*Electric Machinery Mfg. Co., Minneapolis.*

Steam Trap

Bulletin T-1740 gives specifications of new impulse steam trap. 20 pages.—*Yarnall-Waring Co., Philadelphia 18.*

Materials Handling

Work Processing Transfer

Applicable to any chain or cable type conveyor, or to belt conveyors, is conveyor transfer said to be economical to install and to be foolproof in operation. Leaflet briefly discusses unit in various applications.—*Shuler Conveyors, Inc., Lynbrook, N. Y.*

Roller Conveyors

Information covering roller conveyors, for carrying cartons of varying sizes and weights, is provided in 16-page Catalog 60.—*E. W. Buschman Co., Cincinnati 32.*

Trucks and Trailers

Provided in well-illustrated 36-page catalog are descriptions and lists of truck and trailer equipment.—*Fruehauf Trailers, Chicago.*

Multiple V-Belt Drive

16-page manual of recommended engineering standards for multiple V-belt drives indicates proper sheaves and belts to be used in various operations.—*Multiple V-Belt Drive Assn., Chicago.*

Tips to Truckers

To help prevent breakdowns and delays in truck operations, a booklet entitled *GMC Tips to Truckers In the Emergency* has just been published. Advice on preventive maintenance of trucks is also offered.—*GMC Truck &*

Coach Div., General Motors Corp., Pontiac 11, Mich.

Rubber Jar

Handbook gives technical instructions and engineering data on care of motive power storage batteries. Included is six-page section on battery charging.—*Gould National Batteries, Inc., Trenton 7, N. J.*

Positioning Unit

Detailed in Circular 30-219 is positioning equipment, called Working Height Lifter, which by keeping work at convenient height, eliminates lost time and reduces operator fatigue and danger from injury. 2 pages.—*Louis-Shepard Products, Inc., Crawfordsville, Ind.*

Hand Truck

Pictures and details of one- and two-handle hand trucks appear in colorful two-page leaflet. Weight, capacity, etc., are tabulated.—*Standard Pressed Steel Co., Jenkintown, Pa.*

Trucks, Hoists, Scales

Line of gas and electric trucks, hand-lift trucks, electric and hand hoists, and industrial scales are shown and briefly described in 46-page catalog.—*Yale & Towne Mfg. Co., Philadelphia 15.*

Plant Supplies

Roll Bearings

Listed in Technical Note 200 is a complete range of impregnated wood bearings for commonly used conveyor roll sizes. *Arguto Oilless Bearing Co., Philadelphia 44.*

Vertical Pump

Literature details vertical turbine type pumps applicable to liquid transfer, cooling tower, dewatering and similar services where suction is taken from an open source. They are available in single- or multi-stage construction with any desired column length. 8 pages.—*Ingersoll-Rand Co., 11 Broadway, New York City 4.*

Vacuum Fumigation

Evacuation of various types of foodstuff fumigation chambers, covered in new catalog, is said to insure thorough penetration of fumigants. Four pages.—*Beach-Russ Co., 6 Church St., New York City 7.*

Forced Draft Fans

Advantage of forced draft fans specified in 8- page bulletin is extremely high static efficiency. Several types of housings and fan wheels are shown. 8 pages.—*Thermix Corp., Greenwich, Conn.*

Carbon Brushes

Consideration called for in the design, application and manufacture of carbon brushes for electric equipment is subject of 28-page booklet. Included are diagrams of various brushes, also descriptive text and dimension tables.—*General Electric, Schenectady, N. Y.*

Vortex Tube

Form D-2-551 pertains to use of an internal vortex to separate flow of compressed air (or other gas) into hot and cold fractions. Operating charateristic curves are shown.—*Thermo Instruments Co., Belmont, Calif.*

Pillow Block

Pointers on construction and application of pillow blocks ranging in sizes to take shafts 1 15/16 in. to 9 in. dia. are given. Illustrated Catalog No. 88 gives engineering data, bearing capacities, lubrication information, dimension drawings, and types and sizes.—*W. A. Jones Foundry & Machine Co., Chicago 24.*

Floor Cleaner

Catalog depicts application of cleanser reported to eliminate need for disinfectant, deodorant, etc.—*Piatt & Smillie Chemicals, Inc., St. Louis 3.*

Miscellaneous

Water for Canning

Digest-type booklet discusses the many aspects of requirements for adequate water for canning. Material is presented in several sections arranged according to factors of water quality affecting similar unit operations. 28 pages.—*Continental Can Co., Inc., 100 East 42nd St., New York City 17.*

Siphon Tube

Described in 8-page brochure, aluminum siphon tubes are said to eliminate labor and to check erosion.—*Reynolds Metals Co., Louisville, Ky.*

Imprinting

A graphic description of how a variety of nationally known food and drug producers automatically imprint supplementary information on their packages is treated in 6-page brochure. Various models of machines for imprinting cartons, boxes, cans, canisters, jars and bottles are portrayed.—*Adolph Gottscho, Inc., Hillside, N. J.*

Glassware Washer

Spiral-bound booklet is concerned with new laboratory glassware washer designed to take six large basketfuls of labware bottles, funnels, culture tubes, etc.) at one time, and deliver items thoroughly washed, rinsed and chemically clean in quick of time. 8 pages.—*Fisher Scientific Co., Pittsburgh 19.*

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For the Food Processor

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makes foods
golden yellow

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SEND FOR BOOKLET
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Firm is well established with high reputation and AAA rating. Salary rate in $10,000.00 to $15,000.00 bracket.

All replies will be handled in strictest confidence and no inquiries will be made without permission. Our present technical employees have been furnished with a copy of this advertisement. Please address inquiries to

P-1733, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

CHEMIST

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CHICAGO: 520 N. Michigan Ave. (11)
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1—Johnson rotary steam cooker
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Automatic Feeder, Bottom Sealer, Liner, Filler, Top Sealer & Compression Unit.

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POWDER MIXERS & SIFTERS 200 to 1000 lbs.
PROCTOR & SCHWARTZ 14 Tray Shelf Dryer
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1—18"x28" Bird Continuous Centrifugal Stainless Steel, copper housing, with 10 H.P. motor.
4—Swenson-Walker Jacketed Crystallizers in 10' sections, (1—70' lo. and 3—80' lo. each with pulley driven gear reducer, 10 H.P. A.C. motor). Units 24" I.D. x 26" high, with 3/8" steel plate and 1/4" steel jackets, steel covers, ribbon agitators.
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2—Mikro Pulverizers, #1 with 7½ H.P. motor and #2 Type 2W.
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1—24" x 24" Plate and Frame Aluminum Filter Press, 24 Chambers.

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IN PACKING FROZEN CONCENTRATED JUICES

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says Plant Manager of the Concentrate Division, Snively Groves, Inc.

High-speed extractors split the fruit and extract the juice. These Stainless Steel units were built by Brown Citrus Machinery Co., Whittier, Calif.

Thomas V. Snively, Jr., Plant Manager (left), and C. S. Freese, Superintendent of Operations, discuss the merits of Stainless Steel. Votator apparatus for slush freezing the juice is at the right, and a surge blending tank is at the left. Both are Stainless Steel. Votator slush freezing apparatus is made by The Girdler Corp., Louisville, Ky.

THE frozen concentrated juice industry is growing by leaps and bounds. In the season just past, concentrators produced nearly 25 million gallons of frozen orange juice, plus blends and specialty juices. And Stainless Steel, in all types of processing equipment, has played a big part in this rapid expansion.

In fact, "played a big part" seems an understatement in view of this report from Thomas V. Snively, Jr., Plant Manager of the Concentrate Division, Snively Groves, Inc., Winter Haven, Fla.:

"In this operation, where we have to have a high degree of quality and constant and consistent performance, I feel that Stainless Steel is the only thing that can do the job. Certainly, it has proved its value to us, and the fact that it is used almost exclusively in the concentrate industry should indicate that there is nothing that can replace it yet."

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UNITED STATES STEEL

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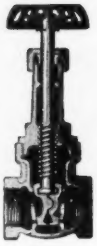

Figure 2125
Double-Wedge Disc
Rising Stem

Figure 2127
Solid-Wedge Disc
Rising Stem

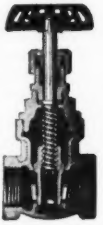

Figure 2129
Single-Wedge Disc
Non-Rising Stem

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WHAT THE NUMBERS MEAN

Editorial Items: Numbers on postcard correspond with those in the index below.

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

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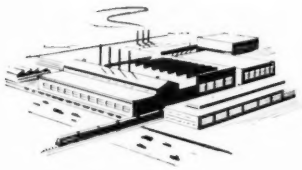

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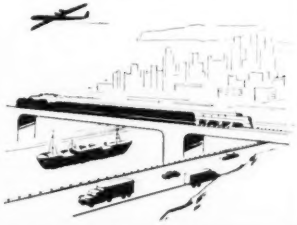

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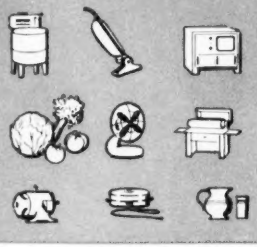

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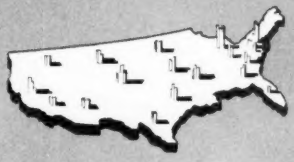

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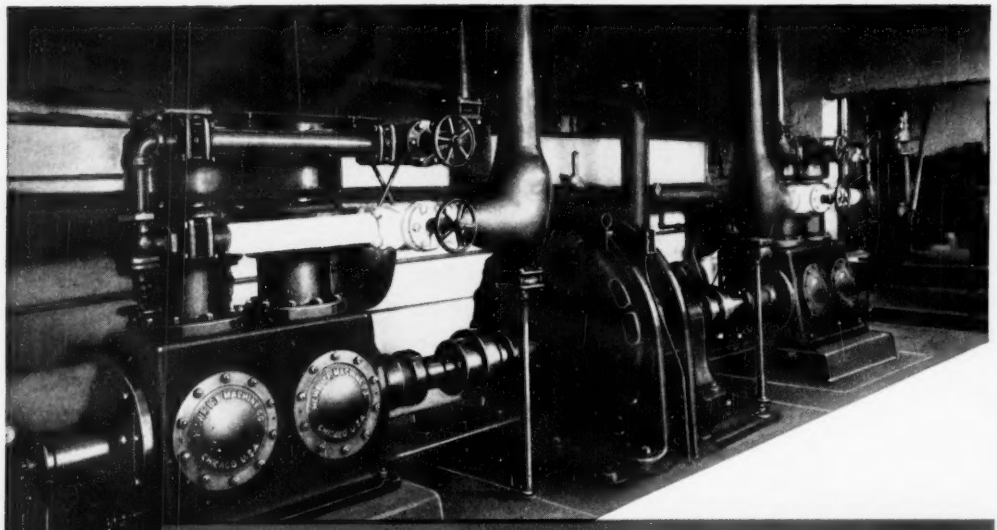

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